RAILROAD GAZETTE

FRIDAY, AUGUST 2, 1895.

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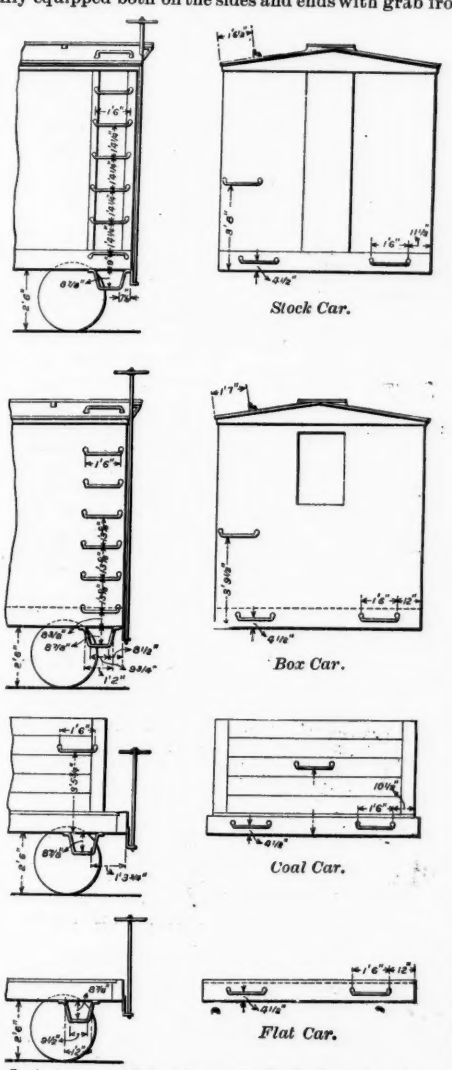
Contributions.

Grab Irons on the Burlington.

Chicago, Burlington & Quincy Railroad,
AURORA, Ill., July 22, 1895.

TO THE EDITOR OF THE RAILROAD GAZETTE:

We notice on page 468 of the *Railroad Gazette* of July 12 in commenting on the law about grab irons appears the following: "It is said that the Burlington has 20,000 cars yet to be equipped with grab irons." This statement has appeared in some of the Chicago daily papers, but is quite incorrect. The C. B. & Q freight cars are all fully equipped both on the sides and ends with grab irons



Grab Irons and Ladders—C., B. & Q. Railroad.

Both ends of box and stock cars are alike, with ladder at diagonal corners. Brake shaft is at one end only. The coal and flat cars have end handles at each end, and side handles, two steps and brake at one end only.

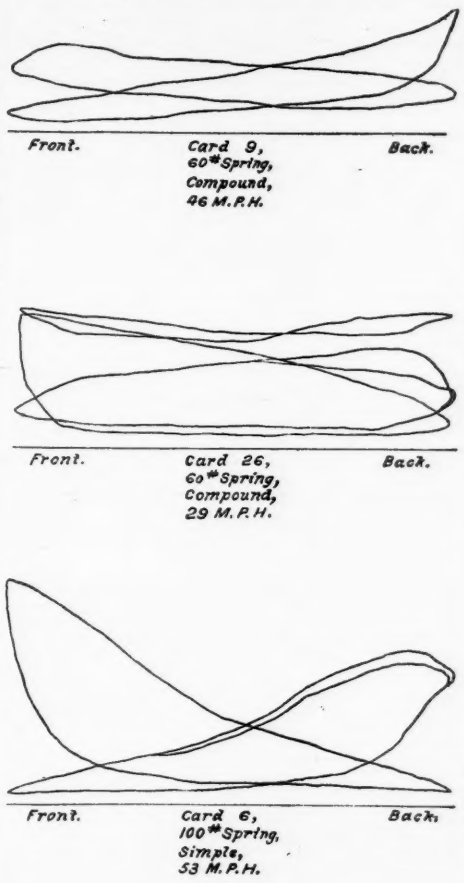
and handholds as is now required by law. We forward a blue print showing our standard on different freight cars which print was prepared for our management at the time the law was passed in 1893. Uniformity in location is what those who use grab irons seek for. You will observe that grab irons are located uniformly on all classes of C. B. & Q. cars. G. W. RHODES, *Supt. M. P.*

Effect of Through Piston Rods on Indicator Cards.

TO THE EDITOR OF THE RAILROAD GAZETTE:

I have been quite interested in reading the article on "Effect on Indicator Cards of Through Piston Rods with a Surrounding Steam Space," in your issue of July 12, 1895, because I was puzzled for some time by similar experiences. I cannot agree with the conclusion that the low steam line and high back pressure of low pressure card 312 are due to condensation because of the through piston rod and its case. It is difficult to believe that the condensation would be so gradual and great in amount as the card in question shows it to be, so long as the slide valve was open, or that opening the cylinder cocks could drain the piston rod casing.

I inclose three indicator cards; cards 9 and 26 from



the low pressure cylinder of a two-cylinder compound, much like the Richmond compound, except that it had no extension piston rod, and therefore the distortion cannot be attributed to that cause. It is also worthy of note that the distorted card appears at the back end of the cylinder on one diagram and at the front end on the other. It seems much more reasonable to attribute this defect in the cards to leaky piston head packing. Such I believe to be the true explanation. The piston packing of the Richmond compound is probably of the snap ring pattern.

Card 6, showing the same defect, was taken from a simple engine which had no extension piston rod, and was proved by examination to have leaky piston head packing. In the case of both the engines from which the accompanying cards were taken no leak through the piston head packing could be discovered by blocking the engine, giving her steam, and opening the cylinder cocks. The leak could be found only by the indicator, and at comparatively high speeds—a point worth remembering.

INDICATOR.

The Atlanta Exhibition.

ATLANTA, Ga., July 26, 1895.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The first impression of the Atlanta Exhibition is now one of disappointment. Some of the buildings are hardly started. Especially is this so with the annex to the transportation building. The transportation building itself is about complete, and can be made ready for occupants within a week. No heavy exhibits will be shown in it, as there is no way of bringing them into the building. All rolling stock will be in the annex, or "car shed" as it is called.

The Plant System has a unique building, nearly completed. It is in the shape of a pyramid, 60 ft. high, with flagstaff 50 ft. higher. The sides of the pyramid are of different sizes and kinds of phosphate rock, laid in cement, on a timber foundation, with tarred paper between the timber and the cement. There are entrances at the middle of each of the four sides to the one large room in the interior. It is lighted by windows about one-third way up the sides of the pyramid.

The Southern Railway is building a small frame structure which will be quite handsome. In it will be exhibited specimens of the various minerals and agricultural products along its lines. The Southern is the only railroad that will have its tracks in the exposition grounds; just outside the grounds it will have a fine depot; it will have a double track from the grounds to the city, and will run trains every five minutes. Its engineers are having trestles rebuilt and track laid rapidly, and will doubtless be ready to handle the crowds.

In addition there will be four electric lines from the grounds, so that facilities for reaching the city will be adequate.

The fine art hall is complete, and is a beatiful building nicely lighted from the roof. It, and the woman's building, which is nearing completion, are of staff, and the handsomest buildings on the grounds. The government building presents the most satisfactory appearing interior. The roof trusses are combination steel and wood and look well. In the manufactures building they are of the combination type, but look much heavier owing to the lower chord being of wood and apparently semi-elliptic in form. Both these buildings will soon be completed. The machinery hall, agricultural hall, forestry building, fire hall and negroes' building are completed, and are all shingle sided, except the forestry building, which is sided with slabs with the bark on. The main posts in the interior are logs of different kinds of wood just as they came from the forest. The auditorium, bell tower, Georgia manufactures building, schoolhouse and a few other buldings are in a more or less advanced stage of construction.

The park is in nice condition and will be an attractive feature. The walks are 60 ft. wide, covered with fine crushed limestone. The sides of the staircases connecting different levels of the grounds, which in a general way represent an amphitheater, are made of granite rubble, and, with vases and posts of the same material, present an attractive appearance.

The lake, which is intended to be of special importance, is in two sections, one of which, according to general report, is proving to be troublesome, inasmuch as the water leaks out as fast as it is pumped in, although not one-fourth full. The branch next Machinery Hall has not been filled, owing to the incomplete condition of a connection to a pool in that building.

With good weather, good management and good luck, everything will be in readiness by the time fixed for the opening, but it will require a strong combination of all three. Much has been done, and yet much remains to be done.

AN ENGINEER.

The Renewing of Worn Steel Rails.

In the *Railroad Gazette* of April 26, 1895, we said that the Pioneer Rail Renewing Company had leased the rail mill of the north works of the Illinois Steel Company and were going to try the process invented by Mr. E. W. McKenna, General Superintendent of the Great Northern Railway Company, for renewing steel rails worn in service. The necessary alterations have been made and the works now have an output of 100 tons a day running on a single turn.

The process seems so far to be very successful. The opinion of Capt. R. W. Hunt that the steel would be improved by a proper reheating and rerolling has been borne out by fractures of the same rail before and after treatment which show that the steel has been changed from a coarse grained structure to a fine close grained one, the difference being clearly perceptible to the eye.

On Thursday, July 25, a representative of the *Railroad Gazette* was invited by Mr. James S. Prentiss, Treasurer of the company, to visit the works. The mill was then running on Michigan Central rails that originally weighed 65 lbs. to the yard, but which had lost about a pound by wear and oxidation. The rails were of the old standard Michigan Central section and were re-rolled to the Hawks, or American Society of Civil Engineers section, 58½ lbs. per yard.

The furnace is of the reverberatory type, 35 ft. long, with grates on one side at each end. They are fired with bituminous coal, a "green" fire being used, and forced by a blast from beneath the grate. Above the grate the flames meet a hot blast to increase the combustion. This blast is treated by passing the cold air through a heater in the furnace and meets the flames before they pass the bridge wall. The amount of air is regulated by a valve in the cold air main, the proportion of air to be directed between the cold blast beneath the grate and the hot blast above the grate being determined by valves placed in the pipes just before it reaches the furnace. The length of the furnace being 35 ft. leaves a distance of 2½ ft. between the ends of the rail and the furnace doors. This insures the rail from contact with air that might enter by the doors and therefore presents loss of weight to oxidation.

In this process it is absolutely necessary to heat the rail uniformly, and the length being 30 ft. it was quite a problem to do this. However, by the construction of the furnace and the handling of the fires this has been accomplished very satisfactorily and the rail on leaving the furnace is of a uniform cherry red about 1,200 deg. Fahr. It was also desired to roll the rail at as low a temperature as possible in order to prevent undue oxidation and better the character of the steel. As high a temperature is not needed to re-roll the rail as was necessary in the orignal rolling on account of the fewer number of passes through the rolls.

About 10 rails are now charged into the furnace at one heat, and the time of heating is about 15 minutes, but it is expected to reduce this to ten minutes. The furnace having doors at each end, as fast as a rail is withdrawn from one end, another rail is charged from the other end. The devices for charging and withdrawing the rail are the invention of Mr. Thos. S. Blair, Jr., General Manager of the mill and are exceedingly neat mechani-

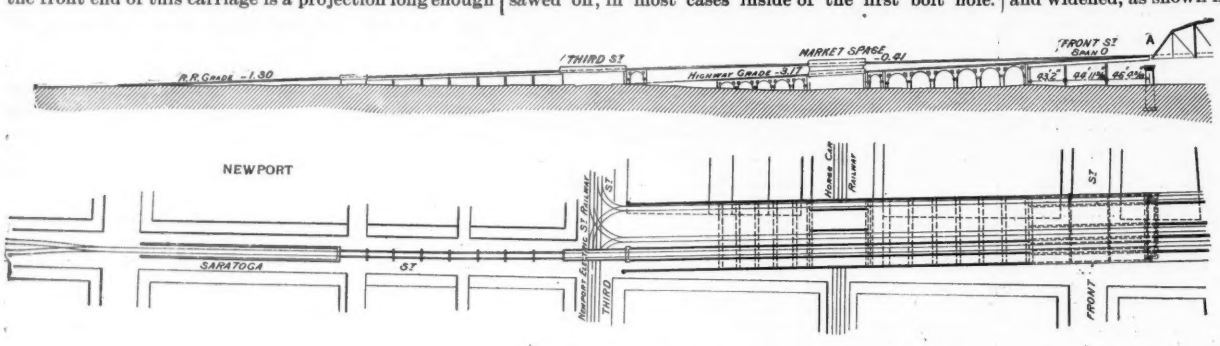
cal arrangements. The charger consists of two channel beams placed with their flanges on the outside, and enough room between them for a rail to rest upright on rollers carried between the channels. They are mounted on wheels, which run on a track extending from the rack on which the old rails are placed to the furnace, and there is a small steam engine mounted on a carriage placed at the end of the channels remote from the furnace. This engine serves the double purpose of running the charger on the track and also of shoving the rail into the furnace. The motive power is obtained by gearing, and a carriage running on the channels shoves the rails from the charger into the furnace. A chain fastened to this carriage and driven by a sprocket wheel on the engine moves the carriage forward and back. On the front end of this carriage is a projection long enough to shove the rail the neccessary distance into the furnace. When Mr. Blair first designed this charger it was thought that the rail after extending more than half its length off the carriage would dig down into the bottom of the furnace, but he was of the opinion that if the rail was placed upright the flange being thin would necessarily be heated first and its expansion would curve the rail up. Such has proved to be the case and no trouble has been experienced however fast the rail is charged.

The device for withdrawing consists of a carriage long enough to allow the rail to rest its length on it, and having two endless chains with bars between them for carrying the rail. A hook is put into a track bolt hole, and after being caught on to one of the bars between the chains, the chains are started and the rail is withdrawn. An engine similar to that on the charger withdraws the rail and also moves the carriage on a track from the furnace to the rolls. A flexible hose for the steam allows the motion of the carriages on the track. In the case of this mill it was necessary to place the withdrawn track on an angle with the furnace in order to clear a column of the building with the 30-ft. rail, and this necessitated an ingenious brake to prevent motion of the carriage on the track.

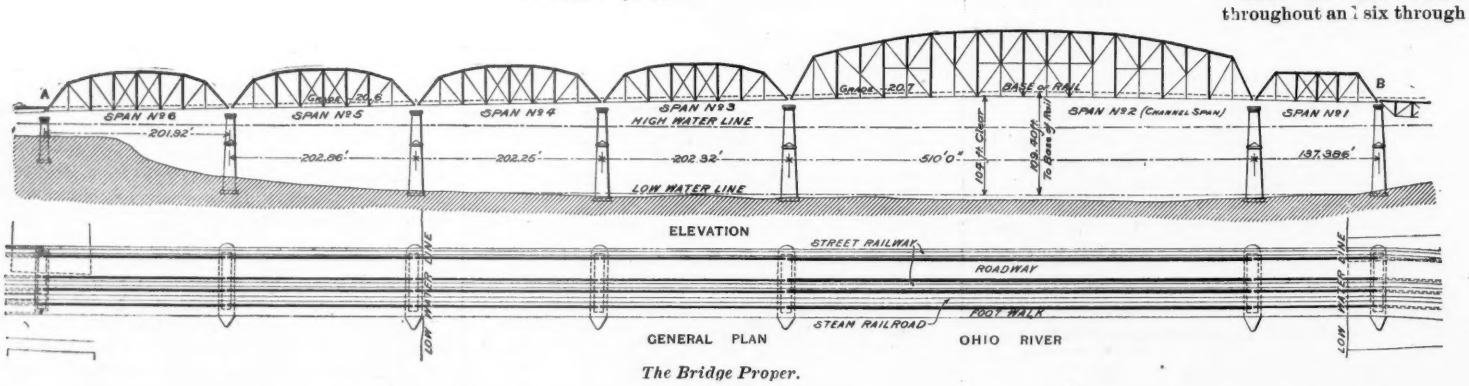
After arriving at the rolls, the chains in the carriage are reversed and the rail is run into the rolls. Before entering the rolls it meets two revolving wire brushes that remove the scale. But two passes are made, the first, compressing the rail about $\frac{3}{4}$ in., fills out the worn places, and leaves only a light finishing pass to complete the re-rolling of the rail. Before entering the rolls for the finishing pass, two steam jets remove the remainder of the scale which would interfere with a good finish being put on the rail.

After passing through the rolls the rough ends are sawed off, in most cases inside of the first bolt hole. New holes are then bored, and the remainder of the process is like that in an ordinary rail mill.

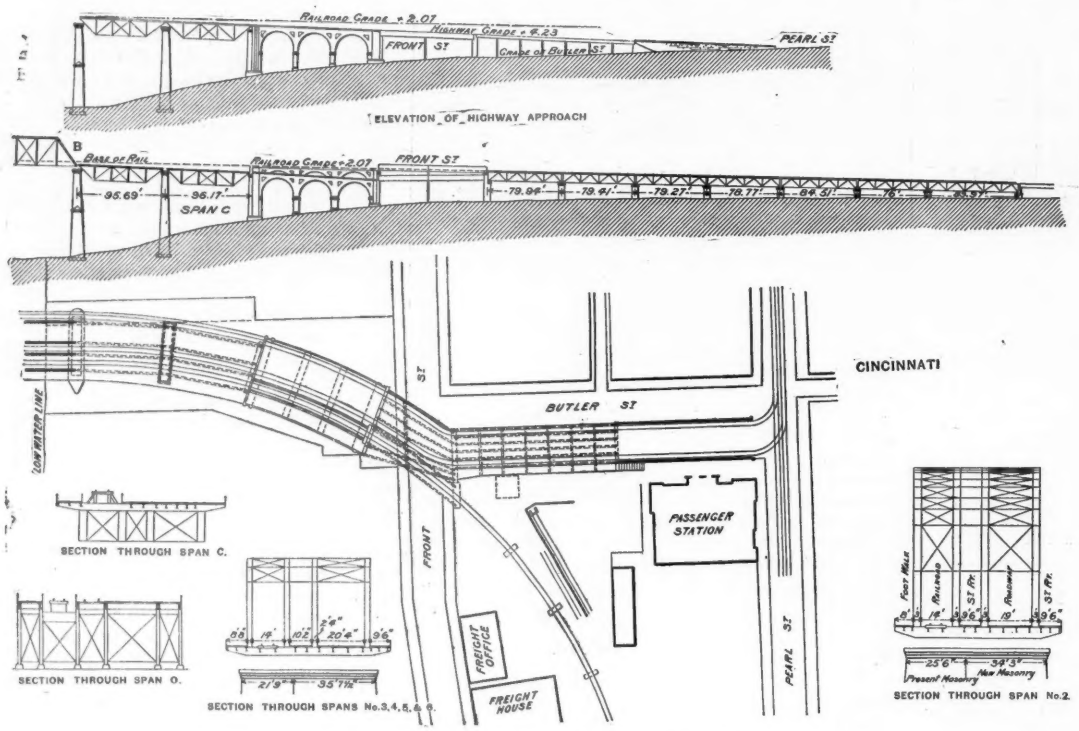
About two feet is gained by elongation, though some rails are so badly worn as to necessitate the cutting off of a greater length. The finished rails are of as good appearance as the best new rails and can be replaced in main track. By this means a considerable saving is secured by the railroad companies, the exact amount of course being dependent on the price of new rails. The cost for renewing the rails is $5 per ton as against a cost of, say $25 per ton for new rails. This, however, does not represent a gain of $20, as old steel rails have a value of about $10 per ton when cut off and used for laying in main track or side-track and as scrap steel. This cost of $5 per ton does not include freight charges, as the rails are delivered on the cars at the works of the Pioneer Rail Renewing Company, and the railroad companies pay the cost of hauling both ways; but, on the other hand, a part of the freight charges would be offset by the cost of hauling the old rails to and from shops for resawing.



The Newport Approach.



The Bridge Proper.



Highway and Railroad Approaches, Cincinnati Side.

Plans, Elevations and Sections of the Newport & Cincinnati Bridge, as Remodeled.

The Newport & Cincinnati Bridge.

The Newport & Cincinnati Bridge, of the Pennsylvania Lines, is being rebuilt according to the plans shown in the engravings. The contract for the foundations and masonry was given to Jutte & Foley, of Pittsburgh, and that for the superstructure, to the Edge Moore Bridge Works, of Wilmington, Del.

The illustrations show a general plan and elevation of the bridge, as it will appear when rebuilt. The bridge and approaches are shown in three sections, the engraving being broken on account of its length. On the Cincinnati side the highway and railroad approaches separate into two distinct sections, as shown. The entire superstructure will be new, the old piers being retained and widened, as shown in the various sections, the new masonry, in fact, being more than that now in place. The new bridge will be more than twice as wide as the old one, its width being made 72 ft. This provides for a 19-ft. roadway, a 14-ft. track space for the railroad, two street railroad track spaces, of 9 ft. 6 in. each, and an 8-ft. footway. The floor beams are extended out beyond the outer trusses to provide for one of the street railroad tracks on one side and the footway on the other.

There are four trusses throughout and six through spans. They are respectively 201.9, 202.8, 202.2, 202.3, 510 and 137.3 ft. each. The 510-ft. channel span is 104 ft. above low water. All the spans have curved upper chords.

The approaches are works of considerable magnitude. That on the Cincinnati side consists of two parts, the highway approach and the railroad approach, both of which are shown in the engraving. They are each on a curve, the railroad approach branching off from the highway part at the corner of Butler and Front streets, and extending down between Pearl and Front streets. The Newport approach is a very long one. As the engraving shows, both approaches are in part deck trusses and in part arches. These approaches will make the grades near the bridge somewhat easier, and will also remove several dangerous grade crossings in Newport.

It is estimated that the work will take about a year, and will cost in the neighborhood of $800,000. Mr. M. J. Becker, Chief Engineer of the Pennsylvania Lines West system, has charge of the work, and to him we are indebted for the drawings which accompany this article.

Consolidation and the Policy of the Southern Railway.

The Transportation Committee of the Macon, Georgia, Chamber of Commerce lately addressed to the President of the Southern Railway a letter of which the substance was as follows:

The consolidation of your company and its control of the traffic of the principal lines entering and centering in Macon is viewed with some degree of apprehension. . . . We believe that you recognize the importance of Macon as a distributing center for your lines, and that you will see that, in building up its interests, that you will be forwarding those of your company. . . . We feel, that we should have an expression from you as to the general line of policy that you will adopt. . . . It is hoped that the local organizations of the various lines under your control in Macon will be disturbed as little as possible.

Some of our best and most conservative citizens are the shopmen and other employees of the railroad companies here, a large part of whom own their own homes and whose interests are centred in Macon, and whose livelihood is dependent on railroad employment.

To this Mr. Spencer replied as follows:

I see no legitimate ground for apprehension upon the part of the people of Macon on account of what you term "consolidation of our company and its control of the traffic of the principal lines entering and centering in Macon," and I assure you that you are entirely right in assuming that the Southern Railway and those interested in its ownership and management recognize the importance of Macon as a distributing center, and that in building up Macon's interests we shall be forwarding those of this company, and that anything done to injure the one will injure the other.

Whatever may be the result of the reorganization of the Central Railroad Company of Georgia, there is no intention that that property shall be operated as a portion of the Southern Railway System. We believe that it would not be good policy to do so, but that the interests of both the Southern and the Central can be best served by the operation of the latter under separate directorship and management, that management being left as free as ever to foster all industries and interests along its lines by all legal and legitimate means.

As regards the Georgia Southern & Florida, the Southern Railway Company and its friends control, not all, but only a majority of the securities. Under these conditions, the property should be managed as a separate corporation, in order that the minority interests shall have fair and equitable treatment and accounting, and there is no purpose on our part, even if we possessed the power, to depart from this, the only proper policy. As large owners in the securities, our desire naturally will be to see this property prosper, and to have it promote, by all legitimate means, the growth and development of the cities and industries located upon its lines.

It is not intended to make, or even to endeavor to make, either of these roads an exclusive connection of the Southern Railway System. Such policy would be harmful to them and, in the end, harmful to us. In a word, it is the policy of the Southern Railway Company to strengthen all its lines, and in every reasonable way to foster the growth of local interests within the territory it serves, rather than to try to force all traffic into particular channels. This does not mean, of course, that it proposes to assume the burden and responsibility, or guarantee the success, of ill-conceived or badly-managed enterprises.

We are also fully mindful of the importance of the location of offices and shops in your city. On the other hand, you know the necessity arising in all classes of business of the strictest economy in operation, and how hazardous it is for those charged with the responsibilities to make definite promises for the future as to the details of corporate management. I assure you, however, that, if in the course of business t e necessity for any change arises, there shall be as little disturbance as possible in Macon of such local organizations as you refer to.

As regards the process of consolidation which you speak of as being viewed with some degree of apprehension by some of the citizens of Macon, permit me through you to say a word to them on the subject.

That consolidation is in part the legitimate and inevitable result of reckless and speculative construction of needless railroads throughout the South, and the hopeless struggle to sustain them when built. This struggle, in the absence of sufficient traffic, produced unreasonable reductions, dishonest rate manipulations, and unjust discriminations. At competitive points rates were unduly and secretly reduced; at noncompetitive points they were left undisturbed or possibly increased in the hope of greater and much-needed revenues. Favored individuals grew rich, favored communities apparently prospered. All others felt outraged, and many of them justly so. This in turn gave rise to much unreasonable popular cla nor for wholesale reductions of rates, and to much unw se and inconsiderate legislation directed against all corporate property.

The chief injustice under which the public was suffering was not unreasonable rates, but unjust and secret dis criminations. The cure for the evils was not reduction, but the establishment of absolute uniformity of rates, applicable alike to all shippers, great or small, and relatively fair as between different communities.

The railroads have suffered heavily; but the public, through the breaking down of the railroads and by unjust discriminations, has probably suffered to an equal extent. You and your fellow-citizens are well aware of the widespread ruin and bankruptcy which came upon the railroad interests of Georgia.

In respect to the consolidation which followed, it might be well not only to consider these among other causes which contributed to this result, but to ask also what else, if anything, was possible under the circumstances.

Experience shows, not only in Georgia, but elsewhere (although it is conspicuously true in that state because of the exceptional disaster suffered by her railroads), that, as a rule, there are but two alternatives for railroad properties under such disastrous conditions. They must either be consolidated to be operated more cheaply or they must be left to starve separately. Even the process of starvation has its end in such imbecility and weakness as to deprive the public of that reasonable efficiency of operation which it demands and has a right to expect from the transportation lines which are chartered to serve it. Weak and imbecile members of the railroad family, like those of the human race, must either be a tax upon the public, or they must be cared for by their stronger fellows. A railroad, unfortunately, unlike an individual when exhausted, is not permitted to die; and, there being no public asylum for incurables of this kind, the inevitable end for them, when they have sunk sufficiently low not to be too burdensome, is to be attached to some larger system, and be nursed and supported in return for the small traffic they can contribute.

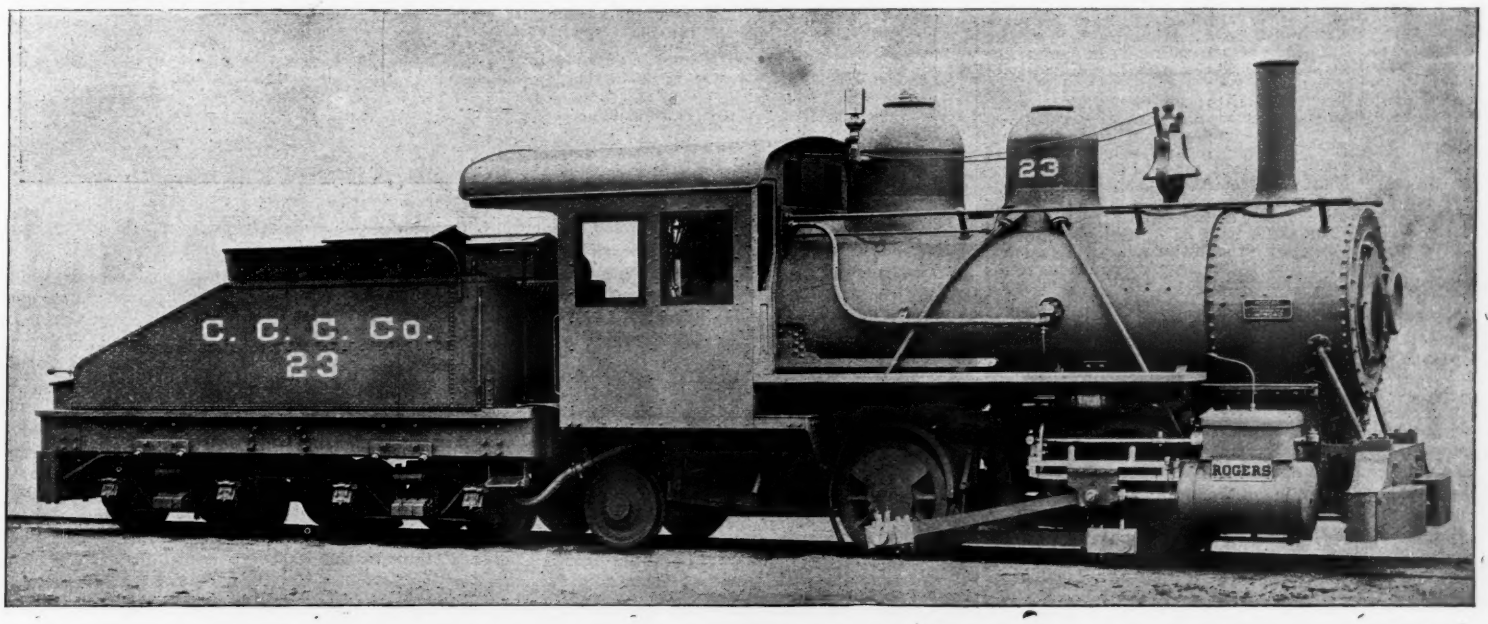
As regards the policy of the Southern Railway Company, I call your attention to the fact that it has not resulted in increase of rates at any point, but has resulted in better roadbed and equipment, improved service and greater safety to the public. There is no reasonable ground for apprehension upon your part, or that of the public, that with the knowledge or intent of its owners, it will result in oppression or injustice to anyone. The purpose is to secure, if possible, by a building-up process, an aggregate volume of traffic necessary to enable it to meet its obligations to its security-holders, who have suffered enormous losses, and to the public, which is constantly demanding better service at a constantly diminishing price. So to do this it must keep its properties in a constantly improving condition; and all it asks as a means to this end is uniform and reasonable rates and the discontinuance in fact of what much legislation seeks but fails to prevent—namely, secret rate-cutting and discrimination.

Its power will be exerted, not for the purpose of favoritism, oppression or extortion, but for the adoption and maintenance, without discrimination between individuals or communities, of reasonable rates that shall be fair alike to the railroads and to the public, and so adjusted as to aid in the growth and development of all the territory it reaches.

Valves, outside lap	1¼ in.
" inside lap or clearance	Line and line
" lead in full gear	7/32 in.
Boiler, type of	Straight top
" working steam pressure	175 lbs.
" material in barrel	Central I. & S. Co.'s Steel
" thickness of material in barrel	7/16 in. and ½ in.
" diameter of barrel outside at first course	52 in.
Seams, kind of horizontal	Quadruple-riveted butt
" " " circumferential	Double-riveted lap
Crown sheet stayed with	Crown bars
Dome, diameter	28 in.
Tubes, number	159
" material	Iron.
" outside diameter	2 in.
" length over sheets	9 ft., 11 in.
Fire-box, length	4 ft.
" width	3 ft., 9½ in.
" depth, front	60 in.
" " back	54 in.
" material	Central I. & S. Co.'s steel.
" thickness of sheets	Flue sheet, ½ in.; crown, ¾ in.; sides and back, 5/16 in.
" brick arch	None.
Grate, kind of	Stationary bars with drop plate.

Tender.

Tank capacity	1,600 gals.
Coal "	3 tons.
Frame	White oak.
Trucks	Diamond.
Wheels, kind	Chilled cast iron.
" diameter	26 in.
Axle, material	Hammered iron.
Journals, size	3¾ in. × 7 in.
Brake on drivers	American steam.



Switching Locomotive for the Cross Creek Coal Company.

Built by the ROGERS LOCOMOTIVE WORKS, *Paterson, N. J.*

A Rogers Switcher.

The illustration from a photograph shows a switching engine lately built by the Rogers Locomotive Company for the Cross Creek Coal Company. The peculiarities of design are apparent from the engraving. It will be observed that the engine has a two-wheel trailing truck, and that the cab is carried on a foot plate bolted to the frame behind the rear drivers. The driver brakes are operated by a cylinder bolted to the under side of the running board acting on a vertical lever coming down outside the frames. The following are the principal dimensions:

Gage	4 ft. ¼ in.
Fuel	Anthracite coal.
Weight on drivers	56,000 lbs.
" " truck wheels	8,000 lbs.
" total	64,000 lbs.
Wheel base, total engine	13 ft. 8 in.
" " driving	6 ft.
Height, center of boiler above rails	6 ft.
" of stack above rails	11 ft. 8 in.
Drivers, number	4
" diameter	36 in.
Truck-wheels, kind	Chilled cast-iron
" diameter	26 in.
Journals, driving axle size	7½ in. × 9 in.
" truck axle, size	5 in. × 12 in.
Axles, driving, material	Hammered iron
" truck "	Hammered iron
Cylinders, diameter	14 in.
Piston stroke	20 in.
" rod, diameter	2½ in.
Kind of piston-rod packing	Jerome metallic
Steam ports, length	12½ in.
" " width	1¼ in.
Exhaust ports, length	12½ in.
" " width	2½ in.
Bridge, width	1¼ in.
Exhaust pipe	Single
Valves, kind of	Richardson's balanced
" greatest travel	4½ in.

Needed Reforms in Handling Freight Cars.*

The two meetings taking place in this city to-day are thoroughly typical of our institutions. We have here a meeting of the National League of Republican Clubs of the United States. They are welcomed to the city by screeching rockets and colored fire, by fife and drum and pomp and c rcumstance. Yet the fact is that the politicians have done absolutely nothing for the good of this country since the resumption of specie payments in 1879. There are now but two questions up for settlement, one is how are we to provide funds for the maintenance of the government, and the other how are we to maintain an honest currency. Neither of these questions would be before us if Congress had not had a session since 1879. It would not make a particle of difference to business if we had meetings of the State Legislature but once in four years, the only present necessity for their meeting being to provide legislation to meet the needs of growing towns and the changes consequent upon electric development.

Very different is the meeting of your association in this peaceful home of commerce; coming here unheralded, without ostentation, quietly and seriously considering the work you have to do.

The ability of man to move himself and his belongings at a speed greater than that of a horse, which is the distinction between this and all the preceding centuries, has brought conditions under which it is very much easier for a man to maintain himself and his dependents in comparative comfort than it ever was before. But while his struggle for existence has been made vastly easier, the effort put forth for comparative advantages has had to be greatly increased, and has involved not only the individual, but communities and nations in the race for industrial supremacy. The position that one nation is going to occupy as against the others in the future is bound to depend upon the cheapness of and facilities for transporting its products. I think, taking into consideration the natural resources of this country, its facilities for transportation by water and by land, and the cheapness of the same, that in the near future it will dominate commercially the nations of the world.

Of this vast investment of over nine thousand millions in our railroads, a very considerable amount is locked up in car equipment. In 1894, according to the Equipment Guide, there were 1,159,742 cars owned by the railroad companies of the United States. In addition to this there were privately owned about 70,000 cars, and the papers show about 25,000 cars under construction; in one form or another 1,250,000 cars, costing $600,000,000, about 6.2 per cent. of the cost of all the railroads, and their importance is very much in excess of their relative cost. There is spent in the maintenance of these cars about $50,000,000 a year, and there is carried as stock on hand for their repair about $25,000,000 worth of material. . . . How are we going to make any money out of our cars? One way is to adapt them to the use of the shippers, and a

* Extracts from an address by Mr. L. F. Loree, Superintendent of the Cleveland & Pittsburgh, before the Convention of Car Service Managers at Cleveland, June 18, 1895.

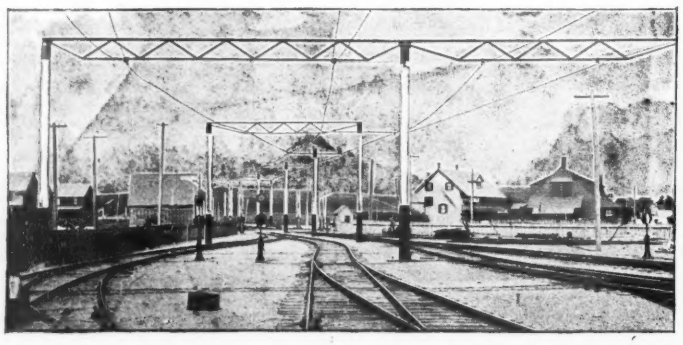
great deal has been done in that direction. In 1882 the weight of the average car and load were 22¼ tons, the car weighing 10 tons, and the ratio of the car to the average load as 1 to 0.7. In 1894 the weight of the car and load were 43 tons. The weight of the car 13 tons, and the ratio as 1 to 1. On my own division we have a very concentrated traffic, and last month we showed a loading of 20 tons to the car and 348 tons to the train. There is another way in which a car may be made remunerative. Increase its speed on the road. A great deal of money has been spent in double tracking, which materially increases the average speed of the trains per hour. Improvement is being made in lap sidings, and the proper arrangement of sidings with respect to the grades. With these, very material increase in speed can be had with trains on a single track. We raised our average speed from 10 to 14 miles an hour with an investment of about $60,000.

Increasing the speed by decreasing the detention is your problem. One of the most important of recent developments, to my mind, was the organization of the first Car Service Association in Omaha in 1887.

Now in reducing detention it seems to me that one of the first things to be done is to include company material in company cars. All over England you see cars lettered "Loco" and all company coal is handled in these cars. One of the worst classes of detention with which we have to struggle is company material. If we could confine the movement of company material to company cars specially marked, and could say to the officer in charge of the department to which the car is consigned, you must move this car, we would interest a class of people who now take no interest in the movement of cars, and that would concentrate the attention of the officers in other departments to their movement. One of the things we have to struggle against is the use of cars for shifting material in yards. We send a car to the furnace for the unloading of ore, after which it will be loaded with steel billets to be moved to the wire mill where it is unloaded and again freighted with wire to go to the nail mill, and perhaps finally delivered to us empty, all the movements, except the first being without revenue to the owner of the car. . . . There is a radical difference between the small and the large shipper. The smaller shipper abuses the cars badly, but he is so small he is tractable, and he pays; but your large shipper feels himself quite as big as you are, and is not tractable. Moreover, he is surrounded by different conditions, and there ought to be some distinction made on reasonable grounds. Whether the twenty-four-hour average plan is the proper basis to work upon, or whether some better thing can be suggested, is one of the problems you might well give consideration to. * * * You also need the confidence of the railroad company. The common fault in large institutions is the difficulty of getting changes in methods authorized and in making any reduction in expenses that is effected by any expenditure of cash. The cost of certain processes are soon reduced to a fixed figure, and any increase in any item is the subject of the most rigid inquiry regardless of the fact that the total cost of production may be substantially reduced, and the individual employee comes to feel that any effort outside the routine method is not only not appreciated but is absolutely distasteful to the governing board. There is a great need of direct contact of the governing authority with the lowest rank of the service, an intercourse which in these large corporations seems almost impossible of attainment. . . .

The Nantasket Beach Road.

We described in the *Railroad Gazette* of June 14 the electric equipment of the Nantasket Beach Branch of the New York, New Haven & Hartford Railroad. We show now some engravings from photographs taken at points along the line. One of these represents the method of supporting the trolley wires at a crossover. Another shows a section of the line on a curve, while the third shows one of the baggage car locomotives with two open cars attached. Four of these baggage cars are now ready for service, and 16 open cars with reversible benches are completed or in course of construction. These cars are similar to the long trolley cars used in city service, but are somewhat higher and are reached from the ground by a flight of three steps. They have a capacity of 80 persons. The closed baggage cars are 42 ft. long over all and weigh when fully equipped over 30 tons. Two of them are equipped with two motors of 100 H. P. each, and each giving 2,000 lbs. horizontal drawbar pull through a 33-in. wheel. The other two are fitted with four motors of the same size. The open motor cars have two motors each. All these motors are of the General Electric 2,000 type and are water-tight and fireproof and similar to those used on the Metropolitan Elevated in Chicago.

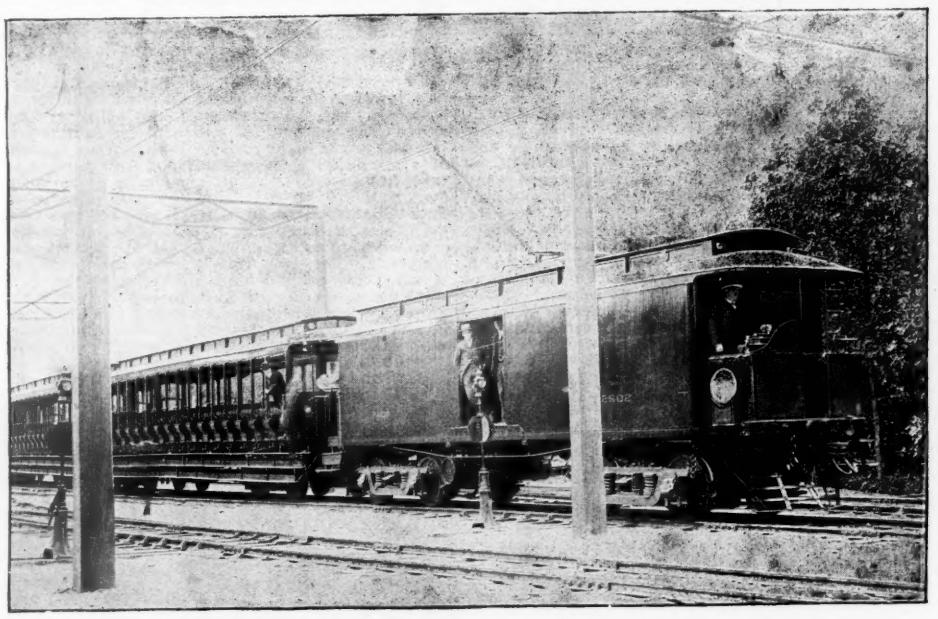


Overhead Construction at Crossovers, Nantasket Beach Road.

The series parallel controller set up on the right-hand side of the platform is of the "L" type and is somewhat larger than the "K2." It embraces the magnetic blow-out principle and all the other good features of the "K2." There are two controllers to each car, the resistances being suspended beneath the car. Immediately to the left of the controller is the air-brake handle. Compressed air for the brakes and whistles is furnished by an oscillating cylinder air compressor, operated by an electric motor controlled by a special automatic rheostat, which regulates the action of the motor in accordance with the pressure in the tanks. A magnetic cut-out is also provided for the air-compressor motor. In the case of the closed cars the air pump is set just inside of the door; in the open cars it stands on the platform to the extreme left of the motorman. Behind the latter and just under the hood is the car cut-out, which, in this case, is an automatic circuit-breaker, similar in type to those used on the generator panels of the switchboard in the power station. The open cars are lighted by 18 incandescent lamps each and the baggage cars by 6 each. Gongs and compressed-air whistles are provided for the cars.

A feature of the line is the system of interlocking switches, so constructed that the overhead switch is thrown at the same time as the track switch.

Some tests of the motors in freight and passenger service were made on June 25, which were described in the *Railroad Gazette* for June 28. The electric installation was done by the General Electric Co. and was completed and the line opened for regular passenger service on Sunday, June 30.



Motor Car and Trailers, Nantasket Beach Road.

Electric Lighting of the Baltic Canal.

The new German waterway from the North Sea to the Baltic will be closed to navigation only when blocked by ice. At other times of the year it may be navigated throughout the 24 hours and hence must be lighted at night. As the canal is over 61 miles long, and the buildings, locks, harbors and harbor lights at either end were also to be supplied with light, the problem offered the combined intricacies of city lighting and long distance power transmission. The contractors, the Helios Company, of Cologne, Germany, appear to have met the conditions ably.

Power plants have been erected near the locks at either end of the canal, 58.75 miles apart. The alternators deliver 2,000 volts, which are transformed down for the lighting of the buildings, locks, etc., and are raised to 7,500 volts for transmission to the lights along the canal.

Where the canal crosses lakes, the channel is indicated by gasbuoys, otherwise incandescent lamps are used, located staggered on the two banks and from 260 ft. apart on curves to 820 ft. apart on tangents. The lead and return conductors of No. 8 S. W. G. copper wire on triple glass insulators, are carried on wooden poles about every 130 ft., and a grounded barb wire over the top of the pole line serves as protection against lightning.

There are four circuits from the station to the center of the canal, each containing 250 25-volt, 25 c. p. lamps. The lamps are suspended on Helios triple porcelain insulators from the end of a neat wrought iron bracket. Without interruption of the line wires the voltage is transformed down at each lamp. its terminals being connected to the secondary winding of the transformer. Thus the burning out of one lamp has no effect on the other lamps in the circuit; only after the destruction or disabling of one-third of all the lamps in one circuit does a regulator at the station become necessary.

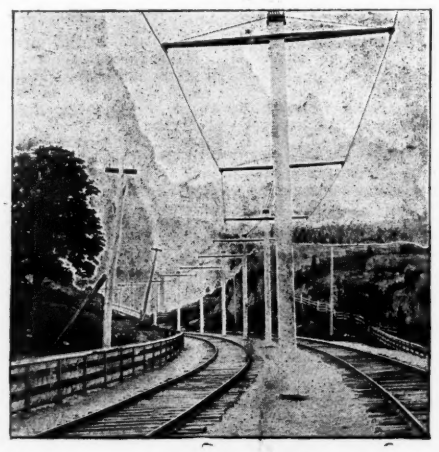
Both power plants being on the south side of the canal, cables, consisting of two rubber covered wires, protected by gutta percha and galvanized iron wire armor, were employed in the crossing of the line under the canal and under the several water courses emptying into the same. The cables are tested for 15,000 volts and are buried 3 ft. deep below the bed of the canal in a dredged trench.

The power plant at each station consists of two horizontal 200 H. P. tandem, condensing engines, 85 revolutions per minute, each directly coupled to an alternating current generator, whose field magnets are bolted to the flywheel. One alternator will carry the load; the other one is held in reserve. Steam is furnished from the pumping station which operates the lock gates and capstans.

The Jamaica Railway.

With the completion next January of the extension of the Jamaica Railway to Port Antonio, the fruit raisers in the section of the country through which the new line passes, will be enabled to save at least four days in getting their goods to the port of Kingston for shipment. The work on this extension, which begins at a point nine miles northeast of Bog Walk and runs to Port Antonio, via Annotta, a distance of 46 miles, is being done by Messrs. James T. McDonald & Co., 80 Broadway, New York, and is very heavy, having 24 tunnels. The line runs through the fruit regions of Jamaica, and the hauling of that produce will constitute the principal traffic of the road.

The original Jamaica Railway was incorporated in 1843 to build a line from Kingston to Spanish Town, 12 miles. This was opened for traffic Nov. 21, 1845, and an extension to Old Harbour, 11 miles distant, was opened on the first of July, 1869. In 1877 the Government of Jamaica bought the road from the controlling company and made many improvements in roadbed and equipment. The permanent way was relaid and ballasted



Section of Line on Curve.

steel rails were substituted for iron, old wooden bridges and draws were replaced by 29 bridges with concrete abutments and wing walls and wrought iron superstructures, and six arch bridges were built entirely of concrete. Five new stations were also built. In December, 1881, a contract was entered into with Messrs. Reid & McKay to extend the road from Old Harbour to Porus, 24½ miles, and in the following January the work of construction began. This was opened for traffic on the second of March, 1885. The branch from Spanish Town to Ewarton, 14½ miles, was afterward built and opened Aug. 17, 1885.

In 1889 the West India Improvement Company was formed by Mr. Frederick Wesson to purchase the railroad from the Government of Jamaica, and on Jan. 1, 1890, the company formally took possession. The work

of extending the road was immediately begun, and on Jan. 2, 1891, the road was opened for traffic 12½ miles from Porus, and March 10, 1892, trains were running on 18 more miles. In 1894 the road was finished to Montego Bay. The main line from Kingston to Montego Bay is 105⅛ miles long.

The grading on the extension is all done and ready for the rails. The maximum grade is 3 per cent. and the maximum curve 17.2 deg. The longest bridge, which is still unfinished, will be 3,500 ft. in length; the longest tunnel is 800 ft.

Following are the officers and directors of both the West India Improvement Co. and the Jamaica Railway Improvement Company: President, Frederick Wesson; Vice-President, Leo E. Frank; Secretary and Treasurer, Adolph R. Frank. These, with Marcus Stine, Willard P. Ward, Jos. Offenbach and J. C. Van Doren, constitute the Board of Directors. The office of this company is at 27 Pine street, New York City. Jamaica Railway: Chairman, Frederick Wesson; Secretary, Louis F. MacKinnon, Kingston, Jamaica; and Chief Engineer,

The Jamaica Railway.

George H. Latham, Port Antonio, Jamaica. The directors are: George H. Latham, Chas. E. Smith, Leo E. Frank, and R. S. Haughton, Government Director.

Adjustable Third Suspension Hanger for Brake Beams.

The Chicago Railway Equipment Company is making an adjustable third suspension hanger for brake beams which is designed to replace the old rigid hanger A general drawing of this is shown in Fig. 1, and a detail of the parts in Fig. 2. The object of this third suspension is to keep the brake beam in the proper position, and thus prevent torsional strains in it. With different styles of trucks and rigid hangers, it was necessary to make a special length hanger for each truck in order that the pull should come in line with the beam, so as to prevent unnecessary strains. This is not necessary with the adjustable hanger as it automatically raises or lowers the beam into the proper horizontal position when the pull is exerted.

It is made of malleable iron, and consists essentially of three parts, *A*, *B* and *C*, Figs. 1 and 2. *A* is the movable

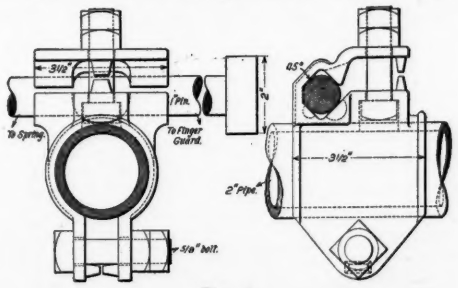


Fig. 3.

piece, and has small teeth on one side which are engaged by the teeth in the small piece *C*. These teeth are kept in contact by a spring which is regulated by bolt *F*. They never engage too tightly to prevent *A* from sliding within *B* when a good pull is exerted, but just sufficiently to prevent the beam from dropping down of its own weight. *B* is fastened by a pin to a rigid iron bar which is attached to the truck transom or bolster. In the drawing casting *E* is shown instead of a rigid bar, but this was only for use in the exhibit at the M. C. B. convention and not for actual service.

When the pull comes on the brake lever, *A* slides within *B* until the beam is in its proper position and then the beam is held.

The release spring *H*, Fig. 1, is the design of Mr. J. H. Lymmarch, Mechanical Engineer of the Chicago, Rock Island & Pacific, who wished to obtain an adjustable spring, or one in which the tension could be regulated more easily than in the old style, where it is dependent on the original form of the spring. This was done by fastening the plate spring *H* to the truck frame and drawing it down by the pin *M*, which is held to the brake beam by the casting *D*, shown in detail in Fig. 3. This casting is clamped fast to the pipe of the brake beam by a ⅝-in. bolt and a similar bolt on the top of the casting holds the pin in place. The tension of the spring is regulated by two nuts on the pin beyond the spring. This is an admirable feature, as the stiffness of the release spring is sometimes excessive and interferes with the braking power. This casting *D* was originally intended to hold the finger-guard used when the brake beam is applied to freight cars and was used for the release spring on account of its adaptability for the purpose.

When used as a holder for the finger-guard a pin of the same size as *M* projects in the opposite direction. On this pin is a hard cast-iron cylinder 6 in. long and 2 in. in diameter, which fits the pin loosely enough to permit revolutions when in contact with the wheel. This feature prevents wear on the pin; which would occur were it in contact with the wheel. The cylinder is held on the pin by a 2-in. head, shown in Fig. 3. This is a patented design.

Early Pools—A Retrospective Railroad Study.

An interesting note on the suppression of railroad competition is made in a phamphlet entitled "Railway Reform," published in England in 1844. The paragraph is intended to show how large a margin of profit the railroads must have when competition for traffic could occur between two roads having a difference between the terminals of 41 miles in a run of about 200. The roads to which reference is made were in competition between London and Manchester, the one taking a direct southerly route from Manchester, while the other goes northerly toward Leeds. The article says; "By the one railroad the goods must be conveyed for 51 miles to be as far on their way to London as when conveyed 10 miles on the other. Yet, incredible as it may at first appear, the Birmingham company agreed, some time since, to pay the Leeds company £5,000 per annum to refrain from competition in the conveyance of goods from Manchester to London. This sum was subsequently reduced to £50 per week. At present there is some dispute going on between the parties, but it will soon be arranged and the refraining-from-competition agreement be carried into full effect."

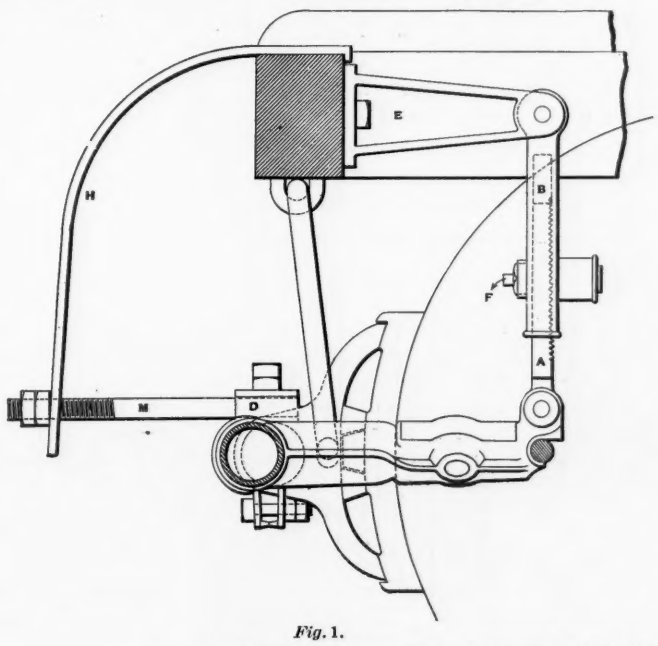


Fig. 1.

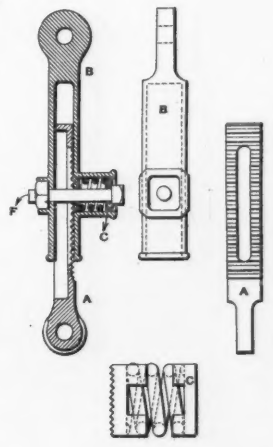


Fig. 2.

Adjustable Third Suspension Hanger for Brake Beams.

consent of the two companies, Mr. Gladstone was asked if he would be good enough to decide between the companies what proportion of the total through traffic should pass by each road, instead of the two companies each fighting for the traffic; he took a good deal of trouble about it and went into evidence as to what they carried, and what was likely to be carried, and the relative distance, and he arrived at this award:

"Memorandum of Award by the Right Honorable W. E. Gladstone, M. P.:

"In matters referred to me by the Great Northern, London & Northwestern and Midland Railway companies jointly, having taken into consideration:

"1. The several proposals of the parties;

"2. The actual distribution of the traffic to and from London and the six towns referred to;

"3. The relative advantages now possessed by the Great Northern and the London and Northwestern *cum* Midland Routes respectively;

"4. Any changes in the balance of those advantages likely to occur, especially as respects the probable opening of the town's line of the Great Northern before one year of the period to which the present award is to apply shall have expired; and

"5. The power possessed by the respective parties of inflicting reciprocal injuries, either directly by measures of their own, or by means of their relations with other companies not parties to the present reference (which injuries it is the object of this present arbitration to obviate), together with any such checks as opinion or the apprehension of legislative interference may impose on the exercise of such power;

"I have determined to award, that the traffic in goods and passengers between London and each of the six towns under-named, for the period from the 4th day of April, 1851, up to the 1st day of January, 1856, shall be divided in the following manner between the parties of the first and second part of this arbitration respective; and I have thus determined upon the assumption that the usual stipulation as to excess carried by either route, and as to any other points, will fall into the award, when regularly drawn, without raising fresh matter for dispute:

PASSENGERS.

		per cent.		per cent.
York,	G. N. R.	80	L. & N. W. Ry. & Midland	20
Doncaster,	"	95	" "	5
Lincoln,	"	85	" "	15
Leeds,	"	65	" "	35
Sheffield,	"	60	" "	40
Wakefield,	"	75	" "	25

GOODS

		per cent.		per cent.
York,	G. N. R.	75	L. & N. W. Ry. & Midland	25
Doncaster,	"	90	" "	10
Lincoln,	"	70	" "	30
Leeds,	"	35	" "	65
Sheffield,	"	30	" "	70
Wakefield,	"	60	" "	40

(Signed) W. E. GLADSTONE."

"HAGLEY, 1851.

Another glimpse of an early pool, one that is now famous in railroad history, is given below from a British blue book, being a select Committee Report on Railway and Canal Bills made in 1853; Samuel Clark, Esq., General Manager Great Northern Railway, being examined.

"Q. We were upon the subject of a general amalgamation, and you were saying that amalgamation, by way of working agreements, is now rapidly going on. You have alluded to an award which was made by Mr. Gladstone between you and the North Western Railway Company; will you state generally what the nature of the agreement is?

"A. The London & North Western and the Great Northern Railway were in active competion at the time of the opening of the Great Northern line at several points touched by those lines. There are six of them: Lincoln, Doncaster, Sheffield, Wakefield, York and Leeds. By

The above award, made so long ago by so high an authority, is similar to the traffic divisions effected by the Trunk Line pool of 1877.

Not only, however, were arrangements as to "pooled business" made through the intervention of the Board of Trade, of which Mr. Gladstone was chairman, but the companies themselves made contracts which were very effective in bringing peace to rival roads. Nearly all the forms of pooling were common long before they were suggested as remedies for the railroad problem in this country. The similarity in the provisions in many of the agreements of the eastern trunk roads to those agreements entered into in Europe is indicative of the source and inspiration of the former.

As far back as 1855 there is a notice of a money pool in England. Several of the clauses of an agreement for this purpose are paraphrased below. It is dated Jan. 14, 1855, and was made between four railroads having com-

petitive interests in the north of England. The receipts rom the goods traffic between Liverpool and Hull and Grimsley were to be divided for the five years commencing January, 1855, as follows: 65 per cent. to Lancashire & Yorkshire and North Eastern companies; and 35 per cent. to the Manchester, Sheffield & Lincolnshire and London & North Western companies; and for the five years commencing Jan. 1, 1860, the percentages were to be 50 per cent. to each. The passenger traffic receipts were also to be divided in the same ratio. When settlements were to be made and it was found that one road had done more business than the other, 20 per cent. was to be allowed to the company for working expenses.

Many clauses were inserted as to the development of the business and the facilities to be afforded by each road for the working of the traffic.

Fortnightly statements of the traffic carried by the companies were to be made, and all settlements were to be made monthly. Disputed points arising under the agreement were to be referred to arbitrators, on the request of either party; and the decision of the arbitrators was to be final. It was also provided that if it was found to be necessary, a manager should be appointed by the companies concerned, for the developing of the common traffic and to superintend the general working of the agreement.

The Shay Locomotive.

The Shay locomotive is not a new contrivance and we have described it before; but it is so useful in its proper place, so rarely seen and so little known that we feel justified in giving space to a more complete illustration of it than we have ever made before.

The example which we have chosen is a Shay locomotive built by the Lima Locomotive & Machine Company for the Buffalo & Susquehanna Railroad. This railroad has seven locomotives of this type in use and has just placed orders for two more. Five hundred of these locomotives have been built and are in use in various parts of the United States, Canada and South America.

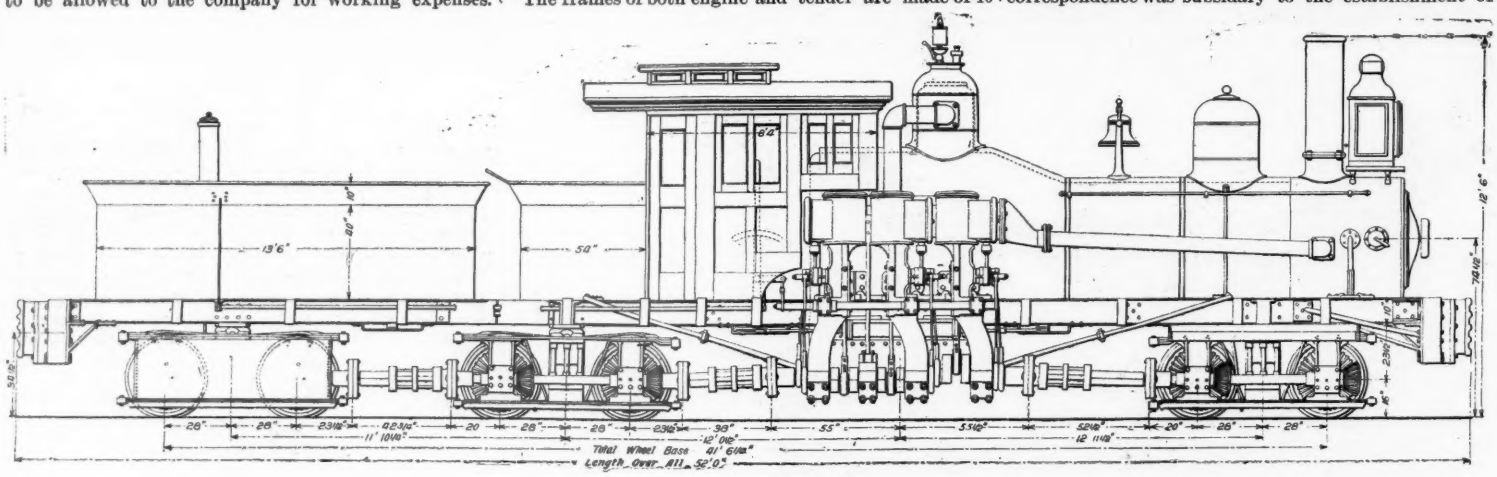
We show a side elevation of the locomotive, a rear view of the cab with the fixtures removed, and a plan of the tender showing the construction of the under frame.

This locomotive is built on three, four-wheel, center-bearing swiveled trucks, the wheels of which are driven by bevel gearing attached to the right-hand wheels of each truck with steel pinions meshing into them, carried by a shaft running in bearings attached to the journal boxes, and extending from axle to axle of each truck. The power is communicated to these pinion shafts by a shaft with flexible couplings extending from the engines, which are placed vertically on the side of the boiler. This arrangement leaves each truck free to adjust itself to curves and irregularities of the track.

The three trucks here spoken of include the tender truck, which is a driving truck also. The trucks are built of steel, are equalized and have coil springs.

The object of this construction is to have the shortest possible rigid wheel base and the longest possible flexible wheel base, thus utilizing all the weight for traction. It is possible to work the locomotive on very sharp curves, the one illustrated running easily on a 65-deg. curves. Its use is confined to roads having heavy grades and sharp curves, and restricted to low speeds.

The frames of both engine and tender are made of 10 in. I-beams, one on each side, that of the engine being strengthened by truss rods as shown. Steam brakes are provided to act on part or all of the drivers either separately or together.

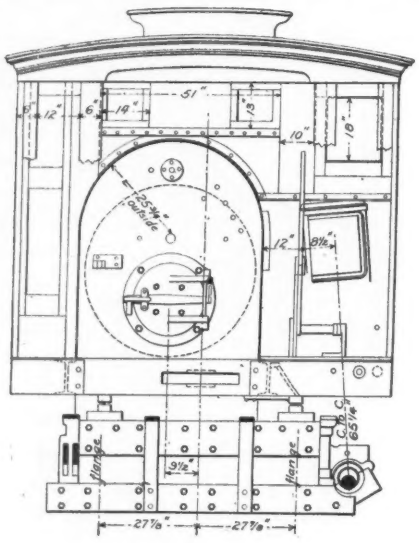


A SHAY LOCOMOTIVE.

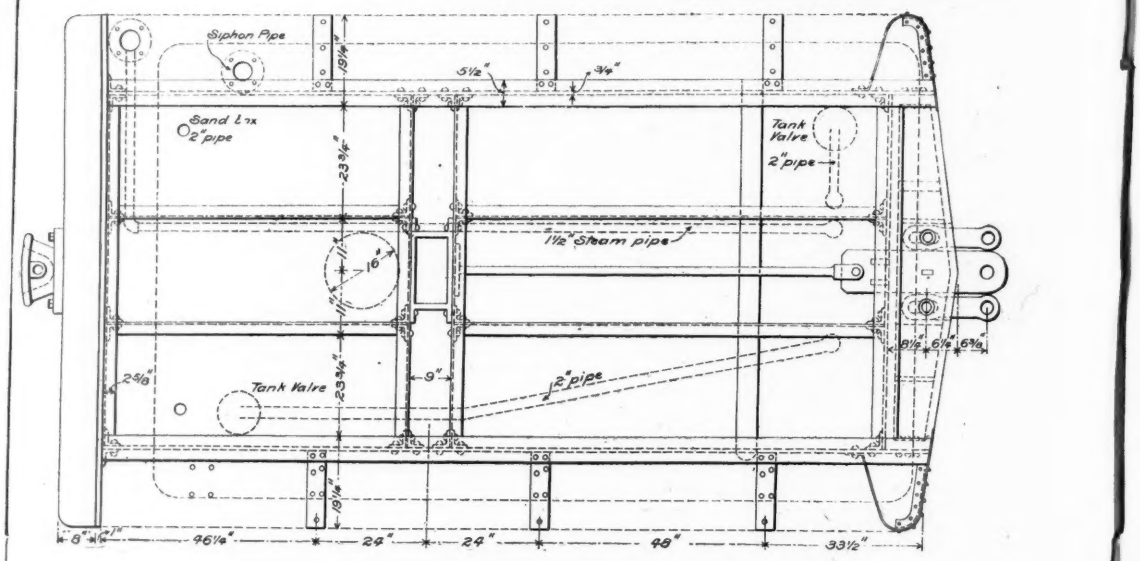
Built by the LIMA LOCOMOTIVE & MACHINE CO., *Lima, Ohio, for the* BUFFALO & SUSQUEHANNA RAILROAD.

The following are the general dimensions.

Gage of track	4 ft. 8½ in.
Total weight in working order	156,100 lbs. all on drivers
Number of drivers	12
Diameter of "	33 in.
Bevel driving gear. No. of teeth on wheel	37
" " " " pinion	18
Rigid wheel base	56 in.
Total " "	41 ft. 4 in.
Length over all	50 ft.
Height from rail to top of stack	12 ft. 6 in.
Distance from front to middle truck centers	25 ft. 9 in.
" " middle to rear " "	11 ft. 10 in.
Three cylinders.	
Dyameter of cylinders	14½ in.
Stroke	12 in.
Type of boiler	Wagon top
Diam " "	48 in.
Material in boiler	Flange steel plate
Thickness of steel	½ in.
" " crown sheet	⅜ in.
" " tube "	½ in.
Number of tubes	150
Length " "	10 ft. 6 in.
Diam. " "	2 in.
Tubes set in copper.	
Length of firebox	72⅞ in.
Width " "	44½ in.
Height " "	56 in.
Water space	3 in. all around
Forged Axles	With 5½ in. × 7 in. journals
Line shafts forged	3⅜ in. diam.
Smokebox diam	48 in.
Boiler pressure	160 lbs.
Rocking grates.	



Cab of Shay Locomotive.



Plan of Tender for Shay Locomotive.

The Postal Service 200 Years Ago.

The Post in Grant and Farm is the title of a book by J. Wilson Hyde, Controller in the General Post-office, Edinburgh, lately published by Macmillan & Co. It tells how letters were carried in England 250 years ago. The postmaster under the Stuarts was not the correct, matter-of-fact clerk of the mercantile aspect who is a cogwheel in the perfected machine of the Victorian era. He was generally an inn-keeper, a stanch supporter of the Crown, though not himself a public officer, but only a subordinate of the farmer who contracted to carry the King's letters. He performed a notable service in keeping the state familiar with the plots of its enemies. The postmaster of Northallerton in 1662 reported that "four disaffected Scottish ministers thought to be spies and deluders of loyal subjects are at Northallerton, and write many letters to Berwick and different parts of Yorkshire." For their services neither the head of the system nor the subordinate officers obtained much money in the way of direct compensation, and their stated salaries were generally greatly in arrears; but they had certain perquisities. . . .

Primarily the post-office was little concerned with the convenience of private letter writers. Frequently the carriers between Calais and Dover refused to make the journey when there were no King's letters to be delivered, and their neglect of the merchants' packets was a subject of remonstrance to the Postmaster-General. The accommodation of private correspondence was subsidary to the establishment of communication between provincial officials and the Court. The messengers went back and forth, and were allowed to take packets of the commoner as well as of the King. Perhaps that was done with the desire to accommodate the commoner, but it is altogether more likely it was done to make him pay the expenses of the royal service. In 1607 James I. appointed Lord Stanhope "Master of the Messengers and Runners, commonly called the King's posts, as well within the kingdom as in foreign parts beyond the seas, within the King's dominions," at a nominal wage of £66 13s. 4d., though it is to be remembered that that represented four times the value of the same sum now. This functionary and his successors in turn farmed out the carrying business, in some cases making their subordinates pay for the privilege of carrying the King's letters and reimburse themselves from the income of extra service.

Down to 1685 there was no recognized post for merchants. Later a regular charge was fixed for carrying letters, the proceeds were forwarded to the general farmer of the post, and nominal salaries were paid, or more frequently promised, to the local postmasters. These officers were protected in certain ways, but the official positions were abused. A petition of eighteen inhabitants of Royston, in Hertford, in 1638, states that "Thomas Haggar, inn-holder, bearing himself so irregularly by authority of his office (as postmaster) abuses his protection, to the great grievance of the town and country; breaking open some of their doors in the night without constable; taking away their horses without their privity; extorting, bribing, beating, commanding, threatening countrymen that will not fee him or do him service with their carts, or spend their money in tippling in his house; hindering poor men from coming to the market to sell their corn, by taking their horses post when there is no cause; causing the horses to be double posted, keeping them longer than the service requires; and misusing young colts and horses not fit for that service, whereby they are oftentimes spoiled."

Postmasters had their hands full in keeping unauthorized persons from carrying passengers and mail contrary to law. In 1649 the London Common Council set up a rival post to that of Prideaux, the domestic Postmaster-General, on the pretence that the Council required another weekly conveyance of letters for their own use, and they actually drove the official posts from the field, in spite of Prideaux's reduction of rates and establishment of extra mails. In 1653 John Manley contracted to pay the Commonwealth £10,000 a year to farm the management of the Inland and Foreign Post Offices.

Until that time the service to the Continent had been separate. The couriers from Germany and the low

countries were pedlers who carried letters through the whole distance, delaying wherever it suited the convenience of their own traffic. After some years, in conformity with other nations, it was determined to erect "staffeti" or packet posts at fit stages, to run day and night, without ceasing. It was provided that the foreign postmasters should take the oath of allegiance, should have an office in London, and give notice of the time for the public to bring their letters. A register was to be kept of the writers of all letters and of the persons to whom they were sent. When the mail arrived from foreign parts, letters from the Government and foreign Ministers were immediately delivered to them, after which a roll of all other letters was set up in the office for every man to view and demand his letters. . . . Improvements were made and London and Antwerp were brought within three days of each other, whilst the carriers for many years had taken from eight to fourteen days. London and Paris were five days apart. Thirty years later the transit was only four days, that to Madrid was twenty-one days. Geneva was seventeen days distant, while the longer journey to Venice was, owing to the rapid service along this much-beaten track, only fifteen days, though to Leghorn it was twenty-one days' journey. To Paris, the Hague, Brussels, Cologne, Hamburg, Copenhagen and Leghorn mails went twice a week; to the other great cities only once.

Early in the reign of Charles I. it was calculated that in the 32 counties of England there were at least 512 market towns, which sent 50 letters a week to London, which made 25,600, which, with their answers at 4d. each, brought in £426 per week. The cost of conveyance being only £37, after a charge of £1,500 a year to pay postmasters for the charge of the King's packets was deducted, a handsome profit was left. In 1660 the farm was granted to Dr. Benjamin Worsley for a term of seven years, at a rental of £20,000. He was shortly turned out and his successor paid £21,500, and in 1674 the rent was £43,000. Before this time the profits of the post-office had been settled by the King on the Duke of York, and when Lord Arlington's grant as Postmaster-General expired in 1677 the Duke entered upon the management of the office and apparently carried it on for a time in his own hands.

With that assumption of post-office functions by royalty Mr. Hyde ends his interesting story. Continuing, he says: It might be supposed that the farming of the posts was an unbusiness-like way of carrying on the work of the public conveyance of letters. But the work was committed to a single individual, who was unfettered by treasury or other restrictions, and who was under the influence of a personal interest. While his tenure lasted he put forth his utmost endeavor to make his office useful to the public and to extend its scope. Further, upon each increase of rent came a new incentive to fresh exertions in the way indicated, and the growth of the post-office was steady and rapid.—*New York Tribune.*

Concerning Rubber Steam and Air-Brake Hose.

A good many ingenious efforts have been made to get a flexible train connection for transmitting air or steam that should be made entirely of metal, and so have greater life than rubber hose, but up to this time nothing has appeared that fills the requirements of service nearly as well as flexible rubber hose. We should say, however, that there is now a flexible, metallic steam joint in considerable use which is apparently entirely satisfactory to those who have equipped with it for train heating. A few years ago the French engineers made a very thorough examination of all metallic connections then existing and rejected them. Then they tried to get at some efficient and systematic means of inspecting air-brake hose to ascertain whether or not any given piece of hose had reached the limit of its life and become dangerous. Such inspection was found to be impracticable and finally the arbitrary rule was made that all rubber air-brake hose should be renewed at the end of 18 months, regardless of its apparent condition. We do not know whether this practice continues, but believe that it does.

It is apparent that our manufacturers have got better results than the Frenchmen, for some of them at least, guarantee air-brake hose for three years in passenger service and 2½ in freight service. The French requirements, it must be understood, were based entirely upon passenger service: that is, they fixed the life of their hose at only one-half the life guaranteed by our own makers. Some of our makers guarantee rubber steam hose for a year, which is perhaps an even more significant illustration of the improvement in manufacturing methods.

With the coming of the necessity for transmitting steam through trains, under considerable pressure, an entirely new set of conditions is introduced, for the rubber has to resist not pressure alone, but heat, and we are all familiar with the fact that manufactured rubber not only loses its tensile strength and elasticity while hot, but deteriorates rapidly when exposed to only moderately high temperatures. The exigencies of steam hose led to the use of wire wrapping, an expedient which appears to have been worse than useless. It simply gives, for the time, a fictitious strength; that is, a strength which does not belong to the material of which the hose itself is made. Three of the engravings herewith show some of the results obtained with wire-wrapped steam hose. The first one, taken from the rear of a tender, shows the exterior burned and chafed by the hot wire and the hose finally burst. Fig. 2 is more significant as showing how the caliber of the hose is gradually reduced. The external diameter being fixed by the wire wrapping the softened and expanding rubber must go somewhere, and as a consequence, gradually fills up the bore of the hose. Fig. 3 is another example of wire-wrapped hose after use part of one season; while Fig. 4 shows a steam hose without wire, that has been in use three seasons and carried steam at pressures of from 35 to 60 lbs.

Fig. 5 is a typical failure of an air-brake hose. Presumably, it failed because made of poor material. Fig. 6 shows one of the difficulties with which the makers of hose have to contend; that is, it is the destruction of good hose by bad use. The end is torn by bad finish of the nipple of the coupling.

Some of the considerations which enter into the manufacture and use of hose for the transmission of steam and compressed air are briefly set forth in a supplement to this issue, and we shall not repeat them here. The reader can there examine the arguments and illustrations. We have selected these few examples as being of special interest.

Fig. 1.

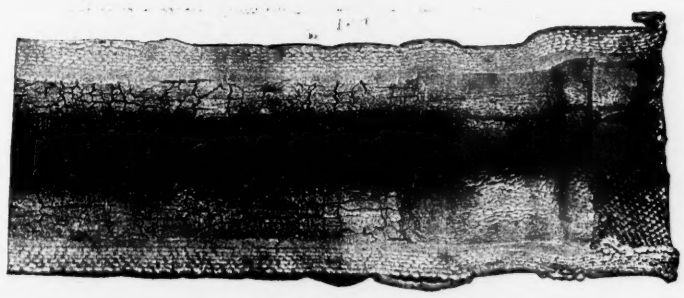


Fig. 4.

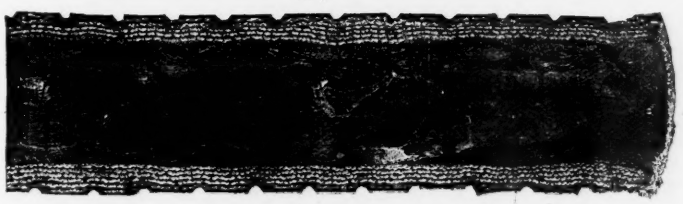


Fig. 3.

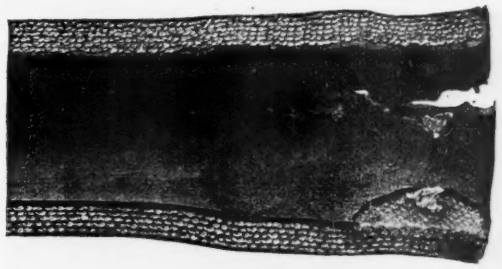


Fig. 6.

Fig. 2.

Fig. 5.

Some Pathological Specimens of Air-Brake and Steam Hose.

Foreign Railroad Notes.

There died recently in France probably the oldest railroad officer in the world, Adolphe d'Eichtal, Honorary President, and until 1893 active president of the Southern Railroad Company of France. As early as 1835 he was President of the Administrative Council of the Paris & St. Germain Railroad. He was aged 90 at the time of his death, having been from the age of 70 to 88 President of a great railroad company.

The Dutch State Railroad Company has had some passenger cars built which are in most respects like those of Prussian limited trains, largely modeled after American cars, having trucks. The trucks are of a new design, patented by the Chief Mechanical Engineer of the company. These cars will run between Flushing and South Germany, via Cologne, connecting with the steamboat line between London and Flushing.

The French, in their protectorate of Tong King, determined in 1889 to lay a track in the highway from Hanoi to the Chinese border, called "the Mandarin road," for strategical purposes, the estimate of the cost thereof being less than $800,000. Having built 11 miles of it, it was thought best to have a regular railroad outside of the highway, so that this part was torn up and rebuilt. Work has progressed under difficulties since, and at the end of 1894 64½ miles had been completed of 60-c. (23¾-in.) gage, with roadbed and structures wide enough for a metre gage if it shall be thought best to change, and all at the cost of $56,888 per mile. It is now proposed to have this Indo-Chinese colony issue bonds for $7,000,000, which will make it possible to extend this road to the Chinese border and build some other lines. Perhaps the greatest significance of this line will be its approach to the very border of China, which presumably would contribute traffic to it, and possibly find it so useful as to desire its extension into China itself.

A passenger hurrying to get into a car at a Prussian railroad station was hurt by stumbling over a trunk which another passenger had put on the platform. He sued the Prussian State Railroad administration for damages. The administration answered that it was not its fault. But the court of highest resort says that it could not claim that unless it had shown that the trunk was left there so short a time before the accident that its servants had not had time to get it out of the way. The train stopped but a very short time at the station; there was likely to be a crowd there, and a passenger taking the train must move hurriedly on the platform. The railroad was bound to exercise the greatest care to keep the way safe and clear for the passengers, and it must prove that it had taken such care.

The Hungarian State railroads have have a capital account which exceeds by $67,500,000 (19 per cent.) the actual money cost of the property, due to discounts on securities sold, etc. On the money cost the net earnings were 4.77 per cent., and on the nominal capital 4 per cent. in 1893. The deficit to be made good from other sources than the railroad profits amounted to about $6,000,000; but before the acquisition of the roads, which made the state system the state payments on account of its guarantees of interest to railroad companies amounted to $10,560,000. The financial condition of the Hungarian railroads generally has greatly improved, though their profits are still small.

New B. & O. Passenger Station in Baltimore.

The first of the Belt Line stations to be built will be that at the Bolton lot in the northwestern part of Baltimore, near Mount Royal avenue. Plans for the new structure have been prepared by Baldwin & Pennington, of Baltimore, and the contract will be awarded shortly. The new station will be called the Mount Royal station.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

Contributions.—*Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to* ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

Advertisements.—*We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay,* EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.*

The Macon Chamber of Commerce gave Mr. Samuel Spencer a chance to write a capital document which we print on another page. The statement of policy with regard to the Georgia Central and the Georgia Southern & Florida is definite and interesting; but the most important part of the communication is the clear statement of the causes which lead inevitably to the ruin of the railroads and to the attempt to restore them to useful life by consolidation; and the statement of the close connection between the prosperity of the railroads and that of the public. The document is short and simple and entirely free from pedantry, and we may hope that it will be read not only by those to whom it was addressed, but by a far greater public. The railroads ought to reprint it and distribute it broadcast. We should not expect it to make a revolution in sentiment. The single sermons that have started a revival must have been very few indeed. But every fresh statement of old truths helps humanity along, and Mr. Spencer's statements of certain truths have the conspicuous merit of being pointed with solemn historical facts. Thus they will penetrate where cumbersome generalities cannot reach.

Concerning Mill Inspection of Structural Steel.

On the 27th of June the Carnegie Steel Co. issued a circular placing some pretty severe restrictions upon the inspection of material in its mills. The general rule laid down was that after July 1 no surface inspection shall be done after the material reached the shipping bed. The work of surface inspection must be confined entirely to examination of the material in its progress from the rolls to the shipping bed. If an inspector cannot be present at the hour of rolling the company will inspect and give a certificate. Naturally a rule so arbitrary and unusual has called out the active opposition of the inspectors and customers. There are two sides to the question of right and wrong in this matter, as there are to most questions, and we do not propose to pass final judgment on it—nor, indeed, are we called upon to do so.

Doubtless the inspector is often a nuisance, but doubtless he is generally necessary. The mills have brought him upon themselves, and they will have to endure him until that millennial day when "enlightened self-interest" leads millmen to fill specifications without watching. It must be impossible for the makers of bridge and structural material and of rails to kill the inspector, and many of them must decline to take part in such an attempt; for they must believe that intelligent inspection is for their own interest. It protects them against their competitors, as well as against their own workmen. The careless workman, or one driving to produce tonnage regardless of quality, must be carefully watched, and so must unscrupulous manufacturers. The scrupulous manufacturers are to a considerable degree protected by careful and systematic inspection of the product of all the mills. Hence the mill owners themselves would not unite against all outside inspection. It is true, moreover, that buyers of material do not pay for inspection for the fun of the thing. They think that their interests need that protection, and they think that they are paying for protection. So we do not look forward to any important reduction in the amount of mill inspection done by or for purchasers.

On the other hand, there is a good deal to be said for the mill men who want to eliminate the outside inspector or to restrict his activities to the proper time and place. He is doubtless often ignorant and often arbitrary, and, presumably, the more ignorant he is the more arbitrary. He sometimes delays the progress of material through the mills, delays shipments and causes extra handling, even when he does not reject material; all of which adds to the cost of production. So it is not strange that when a mill is running full and has many orders in sight it should try to make the inspector as harmless as possible.

These are generalities. In the special case before us it is said to be true that in at least one of the Carnegie mills, and for a certain class of product in that mill, inspection of material in its progress from the rolls to the shipping bed is quite practicable. There are facilities for handling and turning the material, which make it easy for the inspector to see it as it goes along. This is true we believe also of some other mills; but it is not true of all the Carnegie mills to which the new order applies. Consequently, proper inspection of some material in some of the mills becomes impossible.

One of the principal inspecting firms has issued a counterblast in the shape of a statement of requirements which specify that inspectors must be informed of time and place of rolling, that "ample facilities for making all the necessary physical tests be given before any surface inspection is made of material loaded; that sufficient space be provided at the various mills for turning all material after it has become thoroughly cooled, straightened, cut to length and properly stamped with blow numbers and marked for identification; and that where there is not sufficient room inside the mills to conduct inspections as required, they shall handle the material in the manner neccessasy."

On the whole, we are disposed to think that the Carnegie circular will do considerably more good than harm. It will clear the atmosphere. It will bring before customers and the heads of inspecting bureaus and professional inspectors the facts about delays and expense caused by incompetent men or those who are willfully arbitrary. It will perhaps make plain to the mill owners and managers the other fact that outside inspectors must be taken into account, and that no way of eliminating them is yet in sight. From this it follows that, if the mills want to minimize the troubles of inspection, they will have to facilitate the work of inspection, and this very likely will be one practical outcome of the whole thing.

The Proposed Strengthening of the Trunk Line Agreement.

The Presidents of the Trunk lines and Central traffic roads at their Manhattan Beach meeting last week undertook a great task; nothing less than "the organization of a governing board with absolute powers" to make rates, as stated in the first two lines of the programme published in our last issue. So radical a change must needs require thorough consideration by each road interested, and it will not be surprising, therefore, if we have to wait a month or two before anything conclusive is known as to the result of the meeting. Moreover, each president will have to get the formal approval of his directors, and that may make more delay.

Aside from the first clause of the programme just cited, the main features are the fifth clause, to establish joint agencies, and the seventh, to discontinue fast freight line organizations. These mean the discharge of hundreds of soliciting agents, and indicate the thorough-going character of the proposal that the presidents are now considering. It would be possible, of course, to have a central board, with power to make all rates, and still retain the present force of soliciting agents. Soliciting agents have their legitimate functions, however rigidly the rates are fixed at headquarters. But most presidents, accustomed by long habit to existing methods in the conduct of soliciting offices, would be likely to think that the continuance of the solicitors in their positions was a great waste of money; and in most cases it would be.

Whether such a sweeping but most desirable change can be carried through seems doubtful. It involves nothing less than the entire relinquishment, on the part of each president, of his most important commercial function, fixing the prices which he will ask for the product—transportation—that he sells. When the Western roads tried a similar scheme a few years ago the President of the Illinois Central, it will be remembered, held aloof from the agreement, asserting that the directors believed it contrary to the provisions of their charter to delegate to any person or body whatsoever the power to make freight or passenger rates. It may not be precisely correct to speak of the action now pending as an entire abdication, for it has to do only with the rates on through business; that which is distinctly and undoubtedly competitive. But as it will affect nearly all of the business on which rates legitimately fluctuate, nearly all that on which traffic managers must keep close watch, the statement is not far out of the way.

Up to the last presidents' meeting, which ordered the restoration of rates that went into effect July 8 (and which, happily, has thus far been carried out very faithfully), the constant difficulty was that some presidents would not regulate rates; that is, they allowed their subordinates to do it, and to do it in a very unsatisfactory way. Now they propose to correct this fault and to go a great deal farther. They will not only take up their duty, but will grasp it so tightly that they cannot give it back to their subordinates if they wish to; and the most delicate task of the committee, between now and the next meeting, is to prepare an acceptable plan for permitting dissatisfied presidents to take back their powers—to withdraw from the agreement, on *reasonable* notice, while at the same time holding them firmly to it when their supposed grievance leads them to demand release on too short notice. What is a reasonable notice?

With things as they are, the only way to prevent railroad rate demoralization is by making it impossible to changes rates except after a delay, as foolish changes in the constitution of the United States are prevented. Numerous beneficient provisions of that instrument would have been wiped out long ago but for the fact that a change requires several years' time and that during the delay thus introduced wiser counsels prevail. Likewise, a railroad president who a hundred times has found it impossible to resist the temptation to carry freight at unreasonably low rates to punish a competitor, must tie his own hands for a definite length of time into the future in order to force himself into regular behavior. The adjustment of this delay is the crucial problem. Almost any president would be willing to hand his rate-making power over to a conservative board for, say, one month. Mr. Ingalls said, after the June meeting, that the weak lines had made up their minds to submit to their fate—whatever the strong lines might see fit to make it—for two months. But when it comes to longer periods the gravity of the question increases in rapid ratio. In the experiment with per diem car service some five years ago, a very few unfavorable monthly balances led the roads that suffered to back out of the agreement in short order. To lock yourself out of your own office, even for a short time, is a novel proceeding in railroad affairs, and the proposition to give up the rate-making power, even for one year, will probably be discussed a good while by most boards of directors. And yet, if joint agencies are to be established and important officials discharged or transferred, it will not do to go in on any temporary arrangement. Enlistments must be for the war. There can be little doubt that, if an ironclad plan is formulated and set in operation, the best results will be accomplished by sticking to it through thick and thin, for two, three, or even five years. Only by thus making it possible to take a comprehensive view, can fair and reasonable opinions by all parties be assured, or even expected.

The proposed agreement may be said to differ from a pool, in that dependence is placed on men instead of on money. In a pool, the percentages, to be made right by money payments, are fixed in a meeting of all members, and the arbitrators are called in only as a last resort—although in these fast modern days, the last resort is the place where every such question fetches up. In the present case the men—the governing board—are intrusted with the whole matter at the outset. All depends upon their integrity and good judgment. The proposition is not novel, except in the means for making it effectual. The active work to be done by the governing board will be to make differential rates, when any road is, for good reason, dissatisfied; but that is just what Messrs. Goddard and Blanchard are empowered to do now. It would be a very fair statement of the case to say that the only thing necessary, is for each road to keep its promise, already made, to abide by their decisions, according to the rules.

The Working of An Electric Railroad.

In our issue of June 14 appeared a pretty comprehensive description of the arrangements made for working by electricity the Nantasket Beach Branch of the New York, New Haven & Hartford, and some further particulars appear this week. It will be

remembered that this is a line of 6.91 miles, running from Old Colony House Station (now Nantasket Junction) on the South Shore Branch, northward and westward, along a narrow cape, to Pemberton Station. In this distance there are twelve stations, including the station at the Junction and the terminal station at Pemberton. The railroad is not new, but has been operated some years as a steam railroad, and has been converted recently to work by electricity.

There should be no misunderstanding about the reasons for the conversion. It was not made with any idea of saving on the cost of doing existing business. In fact, the fixed charges and operating expenses will be greatly increased. It was believed, however, that an entirely new business could be created; and also (and this perhaps was the most impor ant consideration) it was believed that a body of useful knowledge could be gathered which will soon be needed, and which can be applied to the trolleyizing of other portions of the Consolidated system, and perhaps to branches yet to be built. In other words, the change from steam to electric power was equivalent to building a seaside merry-go-round or toboggan slide so far as traffic goes, and to making of that also a great experimental plant.

The installation is now in operation, but it is too early to get particulars of working costs, nor can we yet judge as to the effect of the new enterprise in building up traffic. The season has been cold and unfavorable to seaside business, and the road has not been called upon to work up to the present capacity of the equipment. At least this was the case two weeks ago; what has happened in the meantime we do not know. We are inclined to believe that the expectations of the company as to volume of business will never be fully realized until a more frequent and commodious steamer service is established between Boston and the end of the cape (Pemberton); but that would only be called for during a few hours of any one day and during a short season, and probably would not pay.

The present week-day service of electric trains on this branch consists of 75 daily trains each way between Pemberton and Nantasket Station (not Nantasket Junction). This distance is about 4.75 miles as scaled off from a map. There are 62 trains each way Sundays. Of the week-day trains 24 each way run as far as Nantasket Junction and 11 run all the way to Boston by way of the Junction and South Shore Branch. Twelve trains run from Boston by the all rail route to Pemberton. These all rail long distance trains run directly through with their own locomotives to Pemberton without breaking up at the Junction.

Of the 75 daily trains each way between Pemberton and Nantasket (4.75 miles) 13 each way are express trains, making only one stop between Pemberton and Nantasket. One of the trains between Pemberton and Nantasket Junction each way is an express, making two stops.

The way trains between Pemberton and Nantasket run the 4.75 miles in 22 minutes and make seven intermediate stops. The distance is run, including the stops, at 12.96 miles an hour, which is moderately good work with stations 0.69 of a mile apart. The express trains make this same distance in 14 minutes, making one intermediate stop, the speed being 14.4 miles an hour. From Pemberton to Nantasket Junction, 6.91 miles, the time of the way trains is 30 minutes with 10 intermediate stops, the speed being 13.8 miles an hour. The time of the express train with two intermediate stops is 22 minutes or 18.84 miles an hour.

The trains run consist partly of a single car equipped with motors and seating 80 passengers, and partly of special motor cars, as described in our former article, adapted for use as baggage cars and with no seats, hauling one or two trailers. We have no data as to the proportion of single cars run, and of trains with one and two trailers. We believe, however, that the express trains are all of the latter class.

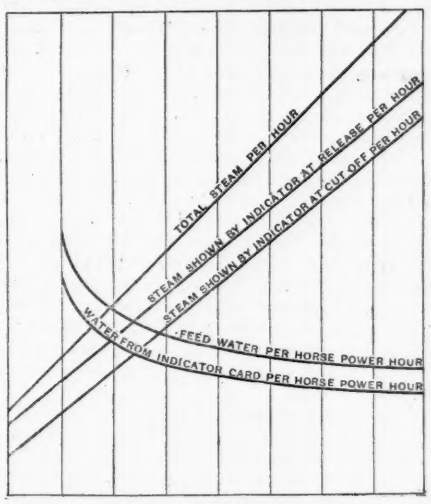
This, it will be seen, is a capital service so far as public accommodation goes, the trains averaging one every 15 minutes from 5:48 in the morning to 1:02 at night. A few intervals are as long as 40 or 45 minutes, and way trains follow expresses at two-minute intervals. Generally the intervals are 15 minutes. As regards speed the service is also very good, but compared with that of the steam operated elevated railroads of New York, it is certainly not remarkable.

We may take, for example, the Sixth avenue line from Rector street to Fiftieth street, 4.27 miles, almost the same distance as from Pemberton to Nantasket. Here trains follow each other every two minutes in the busy hours and every three minutes for a few slack hours, as compared with every 15 minutes at Nantasket Beach. The stops are almost twice as frequent in New York, that is one every 0.3 mile, compared with one every 0.594 mile. The inclusive speed is 11.70 miles an hour in New York, as compared with 12.96. Or we may go from South Ferry to 155th street, 10.76 miles, stopping every 0.38 mile at the rate of 13.45 miles an hour. Of course the weight of the elevated trains—a locomotive and five cars—is far greater than that of the Nantasket Beach trains—one car, or at most a motor car and two trailers. It is quite true that the electric road might run heavier trains, at shorter intervals, stopping oftener, and at higher speeds, if the business called for such greater service. That is entirely another question. We are telling now only what is actually done to-day, and it will be seen that the electric road cannot be compared with the steam road in these special cases in any of the essentials of public accommodation—frequency of trains, frequency of stops, capacity of trains or (stops considered) in speed.

It is highly probable that an analysis of the situation would show that the passengers now handled, or likely to be handled, for a season or two at any rate, could be taken care of cheaper by trains hauled by light steam locomotives than they can be by the electric equipment; but, on the other hand, an essential element in building up the sort of traffic which it is hoped to create is running single cars frequently, which can be done cheaper by electricity than by steam locomotives, *if they are frequent enough.* A very few elevated railroad locomotives would have done the work done at Nantasket Beach to-day at a great saving in fixed charges and a considerable saving in working expenses. But the attractions of *electricity* would not have been present, and the experimental demonstration would not have been made.

The Straight Line Diagram of Locomotive Efficiency.

The late P. A. Willans, inventor of the Willans engine, gave, in a paper before the Institution of Civil Engineers of Great Britain, in 1888, a method of drawing a diagram of the water used per hour when the power of a steam engine is varied by raising and lowering the steam pressure, the speed remaining constant. Later, in 1893, Mr. Willans developed this diagram for compound condensing and non-condensing and triple expansion engines. Mr. Willans' tests were all made on the Willans engine, which is now built in Chicago. Other experimenters have verified the truth of the Willans diagram, and the latest published results are those obtained from some tests made at Cornell University, at Ithaca, by two students, Barraclough and Marks, under the supervision of Dr. Thurston and Prof. Carpenter. These results were given in a paper before the Institution of Civil Engineers of Great Britain, in December, 1894, and published in the *Proceedings* this year. This straight line function is so important and useful to have in mind, that we give a brief statement of it here.


TOTAL STEAM PER HOUR
STEAM SHOWN BY INDICATOR AT RELEASE PER HOUR
STEAM SHOWN BY INDICATOR AT CUT OFF PER HOUR
FEED WATER PER HORSE POWER HOUR
WATER FROM INDICATOR CARD PER HORSE POWER HOUR

Indicated Horse Power with Fixed Cut-off and Boiler Pressure—Variable Speed; or with Fixed Cut-off and Speed—Variable Boiler Pressure.

A very condensed statement of this law of efficiency of the steam engine is given in the following paragraph by Barraclough and Marks: "When the power of an engine is varied, either by altering the initial pressure—the revolutions being constant—or by altering the speed—the initial pressure being constant—the total quantity of water used per hour can be represented by a fixed multiple of the I. H. P. plus a constant. . . . In these last curves the line of 'indicated consumption at cut-off' passes through the zero of ordinates—a result to be expected, as the speed of the engine is then zero. The point at which the line of 'actual steam consumption' cuts the axis of ordinates gives the heat loss per hour due to external radiation from the cylinder. The re-evaporation from cut-off to release increases slightly with the I. H. P. and, therefore, also with the speed."

In other words, a straight line drawn on a rectangular diagram can be made to show the steam used per hour when the speed and the cut-off are constant, and the steam pressure is varied, or when the steam pressure and cut-off are constant and the speed is varied.

A locomotive often works under one of these conditions; namely, constant initial pressure and cut-off and variable speed. As a locomotive is in fact a good simple non-condensing engine, and as the range of trials of Willans and others extends from a small simple to a large condensing triple expansion engine, we may safely assume that the law applies quite approximately to all locomotives, and more especially to those having the recent improvements in valve motion that decrease the back-pressure and compression to a point where reasonable efficiency may be expected.

The typical diagrams of locomotive water efficiency for both compound and simple may be taken as being like those given in the engraving. The straight lines may be drawn between any two reliable tests at a fixed cut-off and therefore, having a limited number of tests, one can predict the efficiency for different steam pressures and speeds very closely by estimating the mean effective pressure and then plotting it on the diagram. The Purdue locomotive tests have not yet been plotted in this way, but it may be expected that they will be and when they are the diagrams will indicate a specific range of efficiency; meantime we must be content to know that the shape of the diagrams will most likely be as here shown.

The official report of the proceedings of the annual convention of Car Service (Demurrage) Managers which was held in Cleveland, June 18, contains a few things not touched upon by our reporter in his account published June 28. One of these is the address of welcome delivered by Mr. L. F. Loree, from which we make an extract in another column. There were several discussions concerning practice in details which brought out expressions showing that opinions are nearly evenly divided between opposite courses. For instance, the question whether to refund demurrage after it has been collected, when it appears that it was caused by the error of some railroad company other than the one making the collection; the majority do refund, but there are places where the rule is to the contrary. There was a discussion as to whether demurrage charges ought to be waived when the weather is too cold to unload freight. Mr. Hoskins, of New Orleans, rather surprised the members by the statement that he had suspended all rules when the temperature went down to 32. It appears, however, that this was on the occasion of the storm of last winter when there was a foot or two of snow at New Orleans. Most of the members said that they had made very few allowances for cold weather. The expense of conducting lawsuits was next discussed. Some associations have their regular attorneys, who receive an annual salary. In others all suits are managed by the regular counsel of the railroads. One member found that the regular railroad attorneys did not push suits with vigor as did outside attorneys whom he engaged. Another manager, who has a lawyer regularly employed, allows him extra compensation on cases which are appealed. Some managers believe in having a lawyer independent of all the roads, because if an individual road conducts litigation it is liable to suffer all of the unfavorable consequences, if any follow, whereas such a burden ought to be borne proportionately by all the roads in the association. Concerning the right method of apportionment of the expenses of car service associations the majority testified that their basis was the number of cars handled the previous month. One calculates on a tonnage basis; one bases each quarter on the number of cars handled in the preceding quarter. Some have an arbitrary apportionment, with a minimum monthly charge.

Self-Propelled Vehicles on Common Roads.

The problem of propelling vehicles on common roads appears to be solving itself in a new and unexpected direction. In England through the influence of the class owning horses, steam traction on the roads has been practically confined to the heavy, slowly moving traction engine preceeded by a man carrying a red flag to warn people of the coming of the mechanical monster. As the speed is limited to four miles an hour and it is economical to run at even a slower speed, no very serious inconvenience is experienced beyond the expense of the flag bearer and there are said to be as many as 7,000 traction engines in use in England, which is more than one for every three railroad locomotives in the United Kingdom.

A very strong feeling is now growing up for the abrogating of the flag and speed clauses in order that something further may be done in the line of mechanical road traction and *The Engineer* which has been carrying on a mild crusade to this end has now announced that it will offer the sum of 1,000 guineas to be given in two or more prizes for road engines entering into public competition on some selected main road.

The recent trials in France of a number of self-propelling vehicles which have run from Paris to Bordeaux and back again to Paris has drawn still greater attention to the subject. Forty-six vehicles, in all, entered the competition, but only 28 presented themselves and only 22 took any effective part in the struggle. Twelve ar-

rived at Bordeaux before the closing of the time and nine returned to Paris within the 100 hours, one accomplishing the distance of 1,175 km. in 48 hours 48 minutes. Of these nine vehicles, which were all of the four-wheeled type known as voitures (carriages), one only was a steam-propelled vehicle, the remaining eight being all gasoline engines using a petroleum spirit of about .700 deg. specific gravity and a low flashing point below 5 deg. C. It is, however, only fair to the one steam vehicle to say that it was old, dating back to the year 1880. Still the triumph is undoubtedly with the gasolene motor, as a few figures will show, which are extracted from *La Nature*, in which are published views of each of the nine successful vehicles.

For each horse-power hour it is sufficient to carry but 400 grams of gasoline, or barely 15 oz., whereas in the steam motor at least 3 kg. of coal and 18 to 20 kilos of water are required per hour, and in an electrically propelled vehicle the accumulators will weigh 100 kilos per horse-power hour. These figures even if we reduce the latter to one-half, and allowing that the figures for the steam carriage appear excessive so far as regards the weight of fuel necessary, are indeed striking and show that so far as can at present be seen an essential of success for rapid movement on common roads is lightness. Indeed the various gasoline carriages had india-rubber tires or even pneumatic tires.

The first to get back to Paris ran the whole distance with an almost absolute regularity night and day and indeed all the gasoline vehicles were remarkable for the steady speed at which they traveled, the steadiest runners coming in first. The steam carriage arrived last but lost it is said 22 hours by a breakdown, so that its running average was really such as would have brought it in fifth in place of ninth. The diagram of the course of each vehicle published by *La Nature* shows only about 12 hours to have been occupied by reason of this breakdown. In the very nature of things the gasoline vehicle can hardly fail to commend itself to engineers as a likely runner in such a competition. Unhampered by any boiler or any load of water or the weight of a set of grate bars, and carrying its fuel in about the most condensed form practically possible, there is absolutely no weight outside the motor engine itself, and many miles can be run with a very small quanity of the liquid. In the present contest the average speed of the first vehicle was about 24 km. per hour or say 15 miles. No figures are given of the horse-power developed, but if we take it even as two, then two pounds of fuel would carry the vehicle 15 miles and the weight of a passenger in fuel would carry it 1,200 miles, showing that a man might set out for his summer vacation and not require to replenish a tank holding three cubic feet of fuel.

The French are also applying the gasoline engine to the propulsion of a still lighter form of vehicle which they call a bicyclette, and one of these performed very creditably in the recent trials. Altogether there is every appearance that the new motor has come to stay, and that for road purposes it stands far above either the steam-engine or the electric accumulator. Indeed the only road vehicles yet brought out for electrical propulsion carry so much dead weight in the shape of the accumulators that they are quite unfitted for use other than upon smoothly asphalted streets.

Southern Pacific Freight Car Standard.

The establishment and maintenance of standards in cars and engines is difficult enough, even on a small railroad; but on a large one, the complications due to long absences of cars on foreign roads and to differences, slight or otherwise, in the views of different mechanical superintendents, often make perfection seemingly out of the question. It is a well-known fact that on some large railroad systems it is believed to be actually economical to continue the use of appliances which have been superseded in the market by something better, rather than introduce the confusion that would be necessitated by a change in the standard throughout the whole of the company's lines. The difficulty we speak of reaches its worst on a road which is very long as compared with the amount of business done; and the Southern Pacific, a road of that kind, has recently found it necessary to make a special record of repairs, in order to gather the data necessary for forming a correct estimate of the suitability of a freight car standard recently adopted. From a circular issued by Mr. William Mahl, Assistant to president Huntington, we quote the following:

By July 1, 1895, there will be in service about 1,300 freight cars built upon common standards. [Presumably standards common to all the lines of the system.—EDITOR.] It is now desired to determine by careful observation the merits of the cars built under these standards, and such other rolling stock as may hereafter be built under common standard specifications; and remedy as far as practicable all deficiencies in construction which may manifest themselves. The service of these cars and the current repairs are distributed over about 8,500 miles of railroad; and some systematic method for the collection of information will be necessary. It has, therefore, been arranged that:

1. All cars or other rolling stock built under common standard specifications will be known by the designation "C. S." marked on the cars.

2. At all shops or junction points where running repairs are made, a report is desired, on a blank furnished for the purpose, of the general character of repairs, and particularly renewals made on such cars. (*a*) The particular part repaired or replaced. (*b*) The location of fracture or breakage, and cause, as far as this can be correctly described. (*c*) The total number of hours of all men employed in making said particular repair, as nearly as this can be given.

3. The above applies only to repairs incident to current use of the cars, and not to cars wrecked or damaged by derailments and collisions, or causes other than those incident to the general service in train or in yards.

4. These reports should be forwarded to the Superintendent of Motive Power and Machinery, at the close of each month, and thereafter by the Superintendent of Motive Power and Machinery to the Mechanical Engineer, with recommendations.

On the Southern Pacific all designs for common standards must be approved by the President. Patent devices must not be used, except with his approval; nor requisitions made for supplies varying from the adopted standards. The jurisdiction of the superintendent of motive power of any one of the roads making up the lines of the system, does not extend beyond the rolling stock of his particular line; first, by reason of the great distance between the Southern Pacific officers in Texas and San Francisco (4 days), and, second, because the state of Texas requires that each company chartered in that state shall be operated by its own officers. This has made it somewhat difficult to establish and maintain standards in rolling stock while at the same time the interchange of cars between the lines of the system is constant. This is particularly true in the state of Texas, where, in the freight trains of the several lines, are frequently hauled cars of all the other lines constituting the system. The differing opinions of the officers of the mechanical departments of the different lines about details of construction, often came up and the absence of definite information as to the service of the details on cars already in use added to the difficulty. It frequently occurred that, no sooner had a new lot of cars been built on previously agreed specifications, than the mechanical head of one of the lines would suggest improvement or put in use an improvement on his own line, considering only the apparent benefits to himself, without considering its effect on the other lines or the disadvantages which might result from disturbing existing standards. In some instances the causes for changes made were incidental and would occur but seldom in the ordinary course of business. It is not intended to check progress in the improvement of rolling stock, but to see that progress is made in a systematic manner and from correct information.

Passes on a Great System of Roads.

Even though Vice-President Kirkman and the German scholars had not furnished a precedent for beginning the story of the railroad with the dawn of recorded history, the pass question, or almost any phase of it, could establish one. President Depew's recent experience is not unprecedented in the free transportation history of the ancient world, and the same may be said of the clergy's claim to passes and low rates. Human nature was acting before two iron rails were laid on a road, and was in full operation at least as early as the completion of that vast road system which brought all parts of the Roman Empire into connection with the capital, or rather the capitals, Rome and Constantinople.

They traveled in those days, or a little later, on schedule time. Cæsarius left Antioch by "night express" (post) for Constantinople, was at Cappadocia (165 Roman miles) the next evening, and arrived at his destination (355 English miles) about noon of the sixth day. Long journeys, too, from Jerusalem by way of Antioch, Rome, Lyons, Boulogne, London, York to one's legion at the wall of Antonius would be 3,740 miles of travel, passing through many cities. A free pass (and aside from official communication the purpose of the system was free transport of troops and their families) was no small gift, over such a route. Augustus Cæsar appears to have established the "post," but it was greatly developed first by Nerva and then by Hadrian, who extended it to all the provinces and laid the expense on the public funds. From the fact that Pliny, who was a high official and a favorite of his Emperor, apologized for granting the use of post-horses to his wife, on urgent business, we may suppose there was no great abuse of passes in earlier days, but on the other hand, Pliny was an exceptional man.

The spy system of some emperors, which furnished at least free transportation to thousands of travelers who kept the Emperor informed of suspicious circumstances, real or invented, no doubt greatly extended the unlimited use of passes—*evectiones* (they called it in those days *exportation*) and perhaps of *tractoriæ*, which included hotel accommodation. Aside from legitimate government officials and their abuse of free transit by gifts, etc., a new cause of complaint arose at a later period from the frequency of church synods. Although without connection with the government, the bishop was a quasi-public officer, and a change in the method of supporting the post may have given him a fairly good ground on which to ask a pass.

The expense of providing horses at the relay stations, which in earlier days on the more important roads were five or six miles apart, each keeping, perhaps, 40 horses, fell on the local officials, the luckless *Curiales*, who were responsible for the regular payment of the imperial and local taxes. These were usually well-to-do citizens, compelled to take the dignity, and, so far as the "post" was concerned, without interest or benefit from all these burdens of free transportation, which included keeping up houses of entertainment. Other travelers than those by post, no doubt, furnished local profit, but the *Curiales* groaned under the expenses of the *cursus publicus*.

So great did the abuses become that Libanius draws a hideous picture of delayed and angry travelers, overworked beasts falling dead when taken out of the yoke, and of cities over-taxed. "This disorder, also," he says, writing of the Emperor, "Julian put a stop to, by prohibiting all posting that was not absolutely necessaay, and by declaring licenses of this kind equally dangerous to grant and to receive," etc. If this last clause refers to free passes, as is probable, then a Roman Emperor deserves the credit of being a pioneer in holding what to-day are sound and advanced ideas on this subject. But like some modern officials, he continued to grant free passes when sending an invitation to a philosopher or other friend to come to court, where no doubt they indirectly did public service.

One must be fair even in discussing passes, and much can be said for the use of passes by the bishops. It had been a custom with the churches from the earliest period to issue a letter to a brother traveling, which would secure him hearty welcome and entertainment in any Christain community. Christianity had long been the religion of the great minority of the empire, especially in cities and towns, and when the post was made a local expense, the bishops, who were at least quasi-public local officials, would naturally make use of the free pass where the locality was largely Christian. But the development of synods, and the increase of the churches rendered even the bishop's pass a burden, and perhaps unfriendly *Curiales* complained. Judging by what we know of the feeling of the time in Christian communities, it would be the weight of the total expense, rather than the use of the pass by the bishop, that would cause complaint.

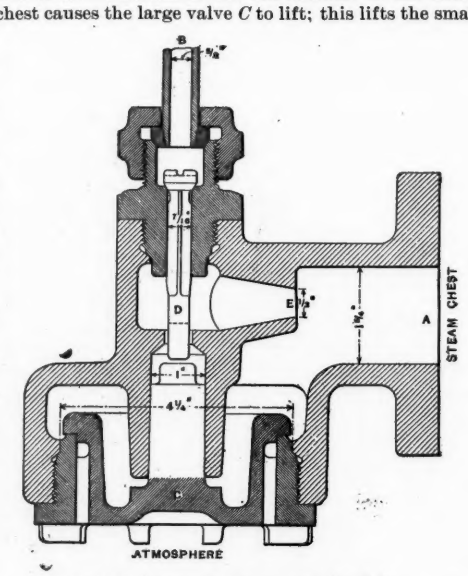
A law of a later period explains the suffering caused by the frequent grants of *evectiones*, withdraws the power from lesser officials and restricts it to the Prætorian Prefects, the imperial governors. Minor magistrates can command a limited number of free passes which must be signed by the Emperor's own hand, and the use of public conveyances is restricted to the pursuit of necessary business.

NEW PUBLICATIONS.

Poor's Manual.—We are informed that Poor's Manual for 1895 will be ready for delivery Aug. 15. The last of the tabulated statistics have now gone to press.

Smith's Automatic Steam and Air Valve.

The illustration shows an air valve designed by Mr. W. M. Smith, Chief Draughtsman of the North-Eastern Railway of England, for the piston-valve locomotive recently built by Mr. Wilson Worsdell, Locomotive Superintendent of that road. The device has a brass body that is attached to the steam chest at *A*, and is connected to the boiler by a copper pipe at *B*. When the engine is run with the throttle closed the vacuum in the steam chest causes the large valve *C* to lift; this lifts the small



Smith's Automatic Steam and Air Valve.

steel valve *D* and admits a small amount of steam from the boiler to the steam chest through the opening *E*. The admission of the steam and air destroys the vacuum and prevents the entrance of smokebox gases and cinders through the exhaust. The steam keeps the surfaces of the pistons and valves moist and prevents the cutting of the rubbing surfaces. The construction of this device is clearly shown by the illustration. It is understood that it will be introduced in this country for large locomotives, especially compounds, although it is serviceable on other locomotives as well.

The Railroads of the World.

Year by year the *Archiv für Eisenbahnwesen* publishes its admirable table giving mileage and other statistics of the railroads of the world. This table is so much more complete than anything else of the sort that it is accepted and used by statistical bureaus everywhere. In past years we have reprinted the most interesting columns, converting French into English units. As lengths are given in kilometers and areas in square kilometers, the conversion is a somewhat tedious process, and great care must be used to avoid numerical mistakes. Of course our translation of the tables has always been widely reprinted, generally without giving us credit for the conversions. This year we have delayed the preparation of the table which appeared in

the May and June issue of the *Archiv*, and the Statistical Bureau of the United States Department of Agriculture has saved us the labor of the conversions, and we reprint below the table prepared by that Bureau. We have checked a number of the most important items and find that they are correct, and therefore assume that the whole work has been done with proper care. The figures for the United States and for British North America are from official reports, later than those at the command of the editor of the *Archiv*, and these are the only changes made by the translator, except that he has given the miles per 100 square miles of area in the United States as 5. The editor of the *Archiv* makes it 6, and we prefer to use this latter figure, for it is correct if we do not include Alaska in the area of the United States. Obviously, it is misleading to include Alaska, for that has no more relation to the provision of railroads in the United States than the area of Greenland.

These tables in the *Archiv* are considerably more extended than as given here. They include the length for each of the five years ending with December, 1893, while the table which we reprint is for the latter year only. The *Archiv* table gives the absolute increase and the increase per cent. between the end of 1889 and the end of 1893, and it gives also the area and population of each of the countries considered.

RAILROADS OF THE WORLD AT THE END OF 1893.

Country.	Length of railroads.	Miles per— 100 square miles of area.	Miles per— 10,000 of population.
	Miles.		
United States	178,709	6*	26.7
British North America	15,768	.5	31.1
Newfoundland	243	.6	11.9
Mexico	6,905	1.	5.7
Total North America	201,625		
Central America	621	.3	1.9
United States of Colombia	261		.7
Cuba	1,076	2.4	6.6
Venezuela	590	.2	2.5
Santo Domingo	72	.3	1.4
Brazil	7,156	.2	5.1
Argentina	8,357	.8	19.3
Paraguay	157	.2	3.4
Uruguay	1,119	1.4	14.1
Chili	1,926	.6	6.
Peru	1,036	.2	3.5
Bolivia	621	.2	2.5
Ecuador	186	.2	1.2
British Guiana	22		.8
Jamaica, Barbadoes, Trinidad, Martinique, Puerto Rico	457		
Total South and Central America	23,957		
Germany	27,863	13.4	5.5
Austria-Hungary (including Bosnia)	18,119	6.9	4.2
Great Britian and Ireland	20,641	16.9	5.3
France	24,455	12.6	6.4
Russia and Finland	20,785	1.	2.1
Italy	8,814	7.9	2.8
Belgium	3,491	29.8	5.5
The Netherlands and Luxemburg	1 924	13.7	3.9
Switzerland	2,122	13.2	7.2
Spain	7,105	3.5	4.
Portugal	1,454	4.	3.1
Denmark	1,386	9.2	6.
Norway	1 002	.8	5.
Sweden	5,457	3.1	11.3
Servia	336	1.8	1.5
Roumania	1,599	3.2	3.9
Greece	569	2.3	2.6
European, Turkey, Bulgaria, and Roumelia	1,130	1.1	1.2
Malta, Jersey, Man	68		
Total Europe	148,230	3.9	4.
British India	18,268	1.	.6
Ceylon	191	.8	.6
Asia Minor	1,056	.2	.7
Russia (Transcaspian district)	890	.5	12.7
Siberia	67		.1
Persia	34		
Dutch India	1,158	.5	.4
Japan	2,018	1.3	.5
Portuguese India	51	3.5	.9
Malay States	87	.3	1.2
China	124		
Siam	16		
Cochin China, Pondicherry, Malacca, Tonquin	162		
Total Asia	24,102		
Egypt	1,081	.3	1.6
Algiers and Tunis	1,984	.6	3.5
Cape Colony	2,443	1.1	14.7
Natal	399	2.4	7.3
South African Republic	421	.3	8.6
Orange Free State	621	1.3	29.9
Mauritius, Réunion, Senegal, Angola, Mozambique, Kongo	746		
Total Africa	7,695		
New Zealand	2,101	2.1	31.3
Victoria	2,974	3.4	25.4
New South Wales	2,546	.8	21.8
South Australia	1,822	.2	52.5
Queensland	2,379	.3	55 1
Tasmania	467	1.8	30.3
West Australia	722		111.1
Hawaii	56	.8	6.2
Total Australasia	13,067	.5	31.4
Recapitulation:			
North America	201,625		
South and Central America	23,957		
Europe	148,230	3.9	4.
Asia	24,102		
Africa	7,695		
Australasia	13,067	.5	31.4
Total	418,676		

*Not including Alaska.

RAILROADS OF THE WORLD.—CAPITALIZATION.

Country.	Date represented.	Miles represented.	Total capital.	Average capital per mile.
United States	June 30, 1894.	171,506	$10,796,473,813	$62,951
Canada	....do....	15 768	887,975,000	56,315
Total		187,274	11,684,448,813	62,392
Germany	Mar. 31, 1894.	27,045	2,605,855,000	97,099
Austria-Hungary	Dec. 31, 1890.	16 484	1,518,489,000	94,751
Great Britain and Ireland	Dec. 31, 1893.	20,611	4,625,349,000	224,082
France	....do....	22,212	2,897,776,000	130,459
Russia	Dec. 31, 1891.	18,140	1,618,738,000	89,234
Italy	Dec. 31, 1890.	6,493	734,389,000	113,099
Belgium	Dec. 31, 1892.	2,019	263,988,000	129,977
Switzerland	....do....	2,034	207,151,000	101,830
Spain	Dec. 31, 1889.	6,273	541,069 000	86,257
The Netherlands	1887.	1,630	132,070,000	81,031
Denmark	Mar. 31, 1892.	948	45 443 000	47,956
Norway	June 30 1893.	971	35,027,000	36,087
Sweden	Dec. 31, 1893.	1.812	74.020,000	40,852
Roumania	Dec. 31, 1892.	1.515	1 5.520,000	76,276
Greece	1854.	603	12,027,000	19,933
Total		123,820	15,453,911,000	119,965
Brazil	Dec. 31, 1891.	6,388	291,011,000	45,561
Argentina	1893.	8,357	4 7,514,000	48,761
Total		14,745	698,558,000	47,376
British India	Dec. 31, 1892.	17.765	1,081 567,000	60,882
Java	Dec. 31, 1893.	607	29,5 6,000	52,006
Japan	Dec. 31, 1893.	551	31,836,00	57,782
Total		18.923	1,142,959,000	60,401
Algiers and Tunis	Dec. 31, 1893.	1.915	123,539,000	63,519
Cape Colony	1893.	2,251	91.441,000	41,951
Total		4,196	217,980,000	51,949
New South Wales	June 30, 1894.	2,501	170,739,000	68,277
South Australia	June 30, 1894.	1,6?5	57.878,000	34,741
Victoria	June 30, 1894.	3.019	179,755 0 0	59,570
Queeensland	June 30, 1894.	2,379	78,186,000	32,874
West Australia	Dec. 31, 1892	268	4,356. 00	20,9?1
Tasmania	Dec. 31, 1893.	419	16 715,000	39,828
New Zealand	Mar. 31, 1894.	1,951	72,081 000	36.9 4
Total		12,142	579,710,000	47,744

Higher Education in Railroad Management.

We find in the *Harvard Graduates' Magazine* for June an article by Mr. George B. Leighton, President of the Los Angeles Terminal Railway, under the title of "Higher Education in Railway Management." Some extracts, giving the principal portion of the article, follow, and we commend it to the special attention of the great universities of the country, and also to the attention of those railroad officers who have influence with such universities. Railroading has become distinctly a broad profession with many specialties, and we have no doubt that it would be for the good of the railroads and of the country if the young men entering railroad life could be prepared for the practice of this profession as many of them are now prepared for the practice of its specialties.

The well-being of countless industries, and, incidentally, of countless homes, may exist or fail under the final yes or no of perhaps a single manager. Under this one manager the heads of the various departments give their yes and no on smaller, yet often vitally important questions to individuals and communities. The ablest of these men to-day have rarely had opportunity to study the essential principles upon which their success and the success of their companies must rest except through their own relatively limited observation and experience. No well-informed and directing mind at the beginning of their work has been beside them to teach them principles of broad application helpful to specific cases, illustrated by the carefully tabulated results of application in different countries under different controlling conditions. It would seem, therefore, that had a course of study in railroad science—may we not use that term?—been offered at one of our universities, it could have helped them.

Let us see what a responsible official in a railroad ought to know, whatever may be his special department. He should know that those who own the property expect and believe that, if properly managed, their investment can derive the usual rate of profit. The railroad must have an economic reason for its existence, and be operated to secure economic success. He must understand the relation of the railroad to the owners, to the public, and to the state. Again, he must understand the importance of managing men, the results of experience in the organization of departments, and selection of proper and efficient subordinates. The railroad official must be broadly versed in the principles of the railroad from a mechanical and engineering standpoint. When called upon to examine a new line, he must be able to pass upon its merits intelligently. He must satisfy himself whether it will be better to build a new line at all; whether it will be better to build a cheap line, but one more expensive to operate, or an expensive line, yet one cheaper to operate. He must know the theories of rates and traffic, must pass intelligently upon such questions as whether a certain traffic is worth doing or not, the true theory of competition, and the limit of competitive business. He will have to know what to leave to subordinates and how to direct them. These are but a few of the qualifications necessary for an efficient manager. His profession is one of the most versatile of all professions. In a broad way, he must be not only a man of affairs, but lawyer, engineer, financier, economist, accountant.

It would be premature in a paper of this character to present a full scheme of the instruction which should be given. My purpose is simply to suggest the needs broadly. As an outline merely of what this course of study should embrace, the following important headings present themselves. Probably it would be better to conduct it as a sort of post-graduate course.

First. There should be a general statement of the subject, reviewing the conditions of commerce prior to the advent of the railroad. Transportation and distribution in 1800. How the land was more of an obstacle to commerce than the sea. Limitations of commerce and travel.

Second. The history of the railroad. Development of the tramway from the cart-road, and the further development of the modern railroad. The surmounting of early difficulties, public opposition, and the lack of proper track and equipment.

Third. Civil engineering. Fundamental principles of economical permanent way. Proper location of line; grades, their effect on operation. History and development of track and bridges.

Fourth. Railway equipment. The adaptation of tools to the work in hand. The varying demands of traffic necessitate material differences, but the elements of efficient equipment now fairly well understood. What is a locomotive? Its work, and its ability to do its work. Restrictions affecting the ideal. Same as to cars and other equipment.

Fifth. Financial organization. Capital and securities of railroads. Bonds, stocks, car trusts, etc. The status of the holders of these to the control of property. Railroad accounting. Study of some approved example with remarks on other methods. Duties of treasurer and auditor.

Sixth. The operation of the railroad. Duties of various officers, and their relations to each other. Detailed study of organization, with special study of approved examples in America and Europe. Duty of general manager. The economical handling of traffic from an operative standpoint. The telegraph as used on railroads.

Seventh. The traffic department. The principles governing traffic, especially in relation to various kinds of commodities. State and other railroad commissioners; their history and necessity and duties. American and foreign commissioners. How they may be of great assistance to the corporation and the public, or disastrous to the interests of both.

Eighth. Position of the railroad under the common and statute law. What a railroad may and may not do. Leases and ownership of other lines from a legal standpoint. Receivers, their duties and responsibilities. Liabilities to the state and to individuals.

Ninth. The railway as a social factor showing the conditions of harmonious relations with the people and with the authority of the state; the government control or regulation of railroads at home and abroad. Interstate Commerce Commission; its history and accomplishments.

Tenth. Labor. The relation of labor to railroads. Labor organizations, beneficial and harmful. Examples of profit-sharing. Future relations as viewed to-day.

Eleventh. Remarks on the geography of leading American systems, noting the difference in conditions affecting traffic, such as difference between Eastern systems of dense traffic with those systems which have been built in advance of actual need in the West, and the difficulties attending operation of light traffic over long distances.

Some of the instruction I have indicated is already given in several American universities, but it is scattered through various departments, and the student himself must properly combine the instruction to profit by it. But the larger portion I have outlined is not now given, nor is the knowledge obtainable in any educational institution known to me. A very considerable part is of an eminently practical kind, and the work of instruction at the beginning will have to be done by intelligent men who have been successful in their various departments of work. . . .

We have railroads, possibly more than we need. For the good of the state, the railroads and the public, we must have trained officials to manage them, in order that senseless rate wars and hot-headed traffic managers may be incidents of the past. I believe to-day that many of the brightest young men of our land would be glad to avail themselves of the opportunity for such a training. An efficient officer earns a higher salary in the railroad than in almost any other profession. May we not hope that one or more of our universities may establish a course looking to the higher education of such young men as desire to fit themselves broadly as railroad men; that however humble a place they may fill at first, they can work intelligently and well? Our experience certainly shows that in many instances managers have been grossly inefficient, and the public grossly ignorant of railroad affairs. The world is full of examples in medicine and law, in the army, and in commercial life of men, who, with little or no methodical training, by sheer force of genius have reached positions of decidedly commanding influence and power, but it is still true, and will always continue to be true, that the trained man is the best man, and that, other things being equal, he will be more effective and successful in any work he may undertake. No genius can be indifferent to what has been already gathered from experience, and this accumulated and adjusted knowledge is the only secure stepping-stone to new methods, new developments, new progress.

The Bolt Cannon Again.

Last September we described, with illustrations, an ingenious piece of artillery used in several of the shops of the Erie system. This is a small gun made out of an old crank pin and used to shoot bolts out of locomotive frames and other accessible places. As used on the Erie it is 10 in. long with a 2-in. bore, about 8 in. deep, and a ¼ in. vent 4 in. from the muzzle to permit the escape of gas after the plunger has been shot far enough out. The plunger is 8 in. long, turned to an easy working fit, with a socket in the outer end to receive the punch. This punch is 4 in. long and turned to an easy fit for the socket, both ends being finished flat. A little less than half an ounce of powder is used.

We show herewith a similar gun as made by Mr. P. H Schreiber, Division Master Mechanic of the Queen & Crescent system at Chattanooga, which differs slightly in details from that used in the Erie shops. Mr. Schreiber's gun is only 5½ in. long and the chamber is only 4 in. deep. The upper vent hole is drilled through both walls as shown in the transverse section, Fig. 1. The plunger and punch are in one piece as shown in Fig. 2. The bore is 2⅛ in. in diameter, and the plunger is 2⅛ in. diameter and 3 in. long, and 1⅛ in. in diameter at the point. In

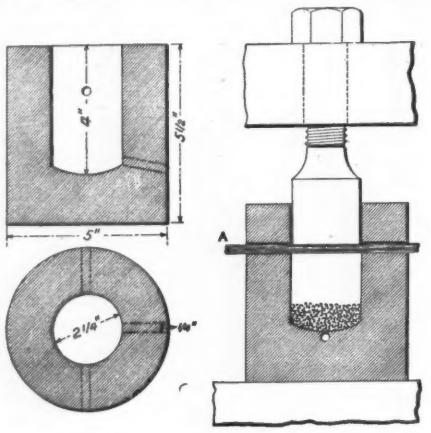


Fig. 1. *Fig. 2.*

Schreiber's Bolt-Gun.

putting the gun in position a rod is run through the upper vent hole as shown at *A*, Fig. 3, in order that the punch may be placed accurately under the bolt to be shot out. Then the rod is withdrawn and the plunger dropped to the powder, which is fired by a slow burning fuse. A tablespoonful of powder is sufficient, except for the worst cases of tight bolts. The gun is so adjusted that the plunger will have a stroke of 2⅛ in. before hitting the end of the bolt. Mr. Schreiber has found this tool very useful. We have not yet learned who invented it.

TECHNICAL.

Manufacturing and Business.

The firm of Ryan & McDonald, contractors, which was composed of C. J. Ryan, of New York, and John B. McDonald, of Baltimore, has been dissolved by mutual consent. This action was decided upon after the completion of the Belt Line tunnel in Baltimore, and has been delayed up to the present time, pending a settlement with the Baltimore & Ohio Railroad Co. This firm has carried out a large number of very important contracts throughout the country since 1882 when it was established. These include the building of the West Shore Railroad from Rochester to Syracuse, grading the Philadelphia extension of the Baltimore & Ohio, building 135 miles of the Chicago, Madison & Northern branches of the Pennsylvania and the Potomac Valley Railroad.

Owing to the greatly increased business which the Detroit Steel & Spring Co. has on hand, several new additions to the shops have become necessary. Besides a large steel addition to the spring department, 75 ft. × 100 ft., two new 150 H. P. boilers have been put in, and the entire boiler plant fitted with coal conveyors, and the mechanical stoker manufactured by the American Stoker Co., of Dayton, O. A new 18-in. mill has been ordered, and an Allis-Corliss engine to run the same. A new 12-in. mill is also being installed in the spring department.

The Dayton Malleable Iron Co. announces that the strike at its works having been declared off by the men, the company is now prepared to promptly fill all orders.

The Queen & Crescent shops at Chattanooga have just been supplied with a new 79-inch lathe with quartering attachment for boring out crank pin holes. It was bought from the Niles Tool Works of Hamilton, O., and has all recent improvements.

Among the more recent railroads to use the disinfectant "Zenoleum" are the Western Maryland, the Canada Atlantic, and the Toledo, St. Louis & Kansas City.

The Detroit Lubricator has just received orders for 36 of its locomotive cylinder lubricators to be shipped abroad. The company is very busy, the business of July having been the largest of any month since the organization of the company.

It is announced that the Merchants' Bar Iron Association at a meeting at Detroit, Mich., on July 30, voted to advance the price of bar iron $2 a ton.

R. W. Hildreth & Co., inspecting engineers, of 50 Broadway, New York, have been engaged to inspect the material and manufacture of the Cooper-Siegel Building on Eighteenth street and Sixth avenue, New York, and have also been engaged to inspect the reconstruction of the Old Colony pier shed, in New York, which blew down the other day. The steel frame of this shed is badly twisted and broken from the accident, and in its reconstruction it is an important matter to see that only undamaged material is used for rebuilding it.

Iron and Steel.

Charles F. Stuart, James Andrews, Walter W. Andrews, E. E. Andrews and James S. McKean, the purchasers of the Moorhead-McClean steel plant, will organize a new company, the Pittsburgh Steel & Iron Co., to operate the plant.

The Maryland Steel Co. has made an increase of about 10 per cent. in the wages of 700 men at Sparrow's Point. The Reading Iron Company has increased wages 10 per cent. at the sheet-iron mill at Reading.

The Pennsylvania Railroad Company has placed an additional order for 9,000 tons of rails at $24 a ton, which makes a total of 56,000 tons ordered this year. The order was divided as follows: Pennsylvania Steel Co., 2,000 tons; Scranton Steel Co., 2,000 tons; Cambria Iron Co., 3,000 tons, and the Edgar Thomson Co., 2,000 tons. Besides this order of 9,000 tons another order will be placed with the Illinois Steel Company for 1,000 tons for the Western lines.

The Aschman Steel Casting Co.'s directors, last week, elected the following officers: President, Hon. E. A. Wheeler; Treasurer, Hon. J. J. Spearman; Secretary, W. K. Naylor. The plant at Sharon, Pa., destroyed by fire two years ago, will be rebuilt at once.

New Stations and Shops.

The Illinois Central is to build a new locomotive roundhouse at New Orleans, one at Canton, Miss., and a third at McComb City, Miss.

The Norfolk & Carolina Railroad, which is the Norfolk Division of the Atlantic Coast Line, and is to be used by the Southern to reach Norfolk, is to build wharves, docks and two large warehouses at Pinner's Point, the terminus of the railroad, opposite Norfolk. The contracts for this work will be let at once. There will be two docks, 140 ft. × 800 ft.; two wharves, 88 ft. × 400 ft. and 76 ft. × 400 ft., and two warehouses, 60 ft. × 400 ft. and 72 ft. × 400 ft. Also a transfer bridge, 75 ft. × 100 ft., for transferring cars from the railroad track to barges.

The site of the Booth Mills at the Chaudiere Falls, Ottawa, which were recently destroyed by fire, is to be used for the erection of machine shops for the Canada Atlantic and Ottawa, Arnprior & Parry Sound roads. Much of the machinery to be put in the shops will be new.

The Southern Railway now has the plans all prepared for the construction of its new shops at Atlanta, Ga. They are in the nature of an extension of the present shops, as already stated. There will be a new machine shop 100 ft. × 200 ft., of brick, with steel roof trusses and entirely fireproof. Ten tracks will enter it The boiler shops, blacksmith shops, carpenter shops will all be much enlarged. The capacity of the shops when completed will be three times the present capacity.

The Jerome Park Reservoir Contract.

On Wednesday, July 24, the Aqueduct Commission of New York awarded the contract for the Jerome Park reservoir to John B. McDonald, of Baltimore, whose bid was $5,472,080. The bid of John O'Brien was $5,297,370. The contract was not awarded to Mr. O'Brien, because of his very bad record on the Croton aqueduct On July 26 a temporary injunction was issued by Judge M. J. O'Brien, of the Supreme Court, at the instance of O'Brien, restraining the city authories from entering into contract with McDonald or any other person or corporation, for building the Jerome Park reservoir. O'Brien alleges that McDonald is not solely interested in the contract, and charges that the action of the Commission was influenced by unlawful means. He also charges that the meeting at which the contract was awarded was illegal and that Mayor Strong should have been present thereat and was not. The Aqueduct Commission met on Monday, July 29, but did nothing more than to defer action until its next stated meeting. The injunction granted by Judge O'Brien was made returnable at the Supreme Court Chambers on Thursday, Aug. 1. The contract cannot be awarded until the injunction is dissolved.

Steel Car Floats on the Mississippi River.

The Schultz Bridge & Iron Co., of Pittsburgh, has launched for the Mississippi River & Bonne Terre Transportation Co., a transfer barge, the hull of which is made of steel. It is 274 ft. long and 38 ft. wide and will carry 16 freight cars. The deck is of steel and the general shape of the boat is similar to that of ordinary wooden barges. The vessel draws only a foot of water when empty. The Mississippi River & Bonne Terre Railroad has its eastern terminus at Riverside, 26 miles below St. Louis, and freight cars are transferred to and from St. Louis by water.

Ferris Wheels.

The Phœnix Iron Co., Phœnixville, Pa., has lately completed a wheel, modeled on the general plan of the Ferris World's Fair wheel, which is to go to Asbury Park, N. J. It is 65 ft. high. Another one has been made for Washington, D. C., and a third, over 100 ft high, is to be made for the Atlanta Exposition. The latter, when erected, will have, in connection, a fixed observatory near the top of the wheel.

The Gould Steam Forge Works.

We noted last week the destruction by fire of the steam forge works of the Gould Coupler Co., at Black Rock, Buffalo. The total loss is said to have been about $70,000. The works will be running again in about 60 days. The coupler works were not in any way affected by the fire, that plant being located at Depew. The company is now turning out over 500 couplers a day, and is prepared to ship all orders promptly.

THE SCRAP HEAP.

Notes.

The Baltimore & Ohio has erected a new clubhouse or waiting-room for its employees at Newark, O.

The Reading Coal & Iron Company has leased docks at Chicago for 10 years, with the privilege of purchase for $100,000.

A press dispatch from Minneapolis says that the Minneapolis, St. Paul & Sault Ste. Marie has restored the pay of certain trainmen to the rates which were in effect prior to Aug. 1, 1893.

The National Tube Works Co., of McKeesport, Pa., is reported to be getting rid of its intemperate employees. A workman who has been inefficient by reason of drinking "will be required to take a total abstinence pledge before an alderman."

Station agents of the Chicago Great Western, except those at terminals, now receive commissions on all tickets sold. Salaries have been reduced from $50 to $40 a month, and the commission is from 1 to 3 per cent. It is said that this will be so adjusted as to be equivalent to an increase in the total compensation.

Train No. 37 of the Lake Shore & Michigan Southern was stopped by robbers near Wauseon, Ind., on the night of July 23 about midnight and the express car was attacked. The way safe was rifled and a little money secured, but six charges of dynamite failed to open the through safe and the robbers left without opening it.

The assessors of Brooklyn, N. Y., have refused, by a vote of 8 to 5, to reduce the valuation of the elevated railroads as asked for by the companies. The original assessment, $170,000 a mile, was complained of as excessive on account of the large falling off in business due to the competition of the electric lines on the surface of the streets, and a rate of $100,000 a mile was asked for. A minority of the Board were in favor of making the rate $125,000 a mile.

Heavy rains were reported from La Junta, Col., July 23, many bridges being washed away. Among these was the railroad bridge across Tempas Creek. A similar report came from Rocky Ford. In the region of Santa Fe, N. M., there were a great many washouts. Near Albuquerque, 12 miles of track was made impassable. On the following day there were reports of the same kind from El Paso, Tex., where several railroad bridges were washed away. On the Peoria Branch of the Chicago, Burlington & Quincy, July 26, there were bad washouts and one bridge was carried away. Two bridges were washed away on the Chicago & Northwestern, near Morrison, Ill.

At Milwaukee last week, Judge Seaman rendered a decision sustaining the demurrer in the case of the United States against the Chicago, Milwaukee & St. Paul Railroad to compel the payment of a forfeiture of $5,000 for failure to make an annual report to the Interstate Commerce Commission. It was contended that the law under which the suit was brought applied only to such companies as had received a grant or subsidy from the Government, and the question was whether the Chicago, Milwaukee & St. Paul was the actual successor of four companies which received the grants. Judge Seaman sustained the demurrer.

A press dispatch from Winnipeg announces that the Western Union is making arrangements to build a telegraph line to Alaska. The story goes on to tell about the line to Behring Straits, which was begun 30 years ago, when it was believed impracticable to work a cable successfully across the Atlantic Ocean, and the intention seems to be to convey the impression that the existence of this old line will make the new project easier than it otherwise would be; but the narrator admits, as he obviously must, that the poles of the old line have now rotted down, and we suspect that his story is based largely on his own imagination.

Passenger train No. 2 of the Lake Shore & Michigan Southern was boarded by about 20 tramps at Ashtabula, O., on Thursday night of last week, and they had their own way as far as Erie, where eight of them were arrested. Gangs of "hoboes," armed with pistols, infest the line of the Lake Shore east of Erie, and it is said that they have robbed a good many sailors and other trespassers with more or less money who ride on the night freight trains. Near Philadelphia, one night last week, a gang of about 35 tramps took possession of a freight train of the Philadelphia, Wilmington & Baltimore, and rode nearly to Wilmington. The conductor stopped the train at Gray's Ferry and tried to dislodge the intruders, but they showed fight and compelled him to proceed. He managed to telegraph ahead, however, and succeeded in having 26 of the tramps arrested.

Fire Guards on the C. P. R.

The Canadian Pacific has had a fire guard eight furrows wide ploughed on both sides of the railroad, and at some distance from the track, from Indian Head to Calgary [506 miles]. The space between the track and the guard is burnt over, thus guarding effectually against the ignition of fires by sparks from locomotives. This work has been done at great cost, but it will be permanent, as next year the guards will be backset, and afterward kept free from vegetation by harrowing. Similar guards will be made along the Soo line between the boundary and the main line. With these protective measures on the part of the company and the exercise of care on the part of settlers and travelers, fires should be of rare occurrence.—*Manitoba Free Press.*

Train Wreckers.

Attempts to wreck passenger trains are reported in the newspapers with unfailing regularity, with perhaps a slight increase in the average number since the warm weather began. A man named Waterman, arrested at Lowell, Mich., last week on the charge of tearing up the track of the Detroit, Grand Haven & Milwaukee, and who confessed the crime, offered an explanation which is considerably out of the usual run. He said that his object was to produce a wreck of a passenger train which would be attended by sufficient confusion to enable him to throw himself into the wreck, and then pretend to be injured, thus laying the foundation for a claim for damages. Waterman was sentenced by the court to 30 years' imprisonment. Among the frequent reports of stone throwing there was one lately from Dayton, O., stating that ex-Governor Foraker, while riding in a sleeping car on the Big Four road, was cut in the face by the broken glass from a window where he was sitting, which was broken by a large stone thrown by unknown persons outside. The stone barely missed the Governor's head. If more governors and fewer common people were thus imperilled—we do not mean harmed—perhaps the police authorities would more effectually cope with this kind of lawlessness.

Canadian Canals.

The parliament of Canada which has just concluded its session, has voted the sum of $2,181,200 to be expended upon canal construction. The appropriation is allotted as follows: Soulanges Canal (construction), $600,000; Cornwall Canal (enlargement), $350,000: Rapide Plat (enlargement), $200,000; Galops Rapids, $140,000; St. Lawrence River, $5,000; Murray Canal, $10,000; Trent Valley Canal, $400,000; Sault Ste. Marie Canal, $150,000; Lachme Canal, $175,000; Lake St. Louis Channel, $100,000; St. Peter's Canal, $2,500; Grenville Canal, $40,000; Welland Canal, $5,000; Welland Canal (land damages), $3,700. There is also an appropriation of $75,000 for work on the St. Lawrence Ship Channel.

The Canadian "Soo" Canal.

It is now announced that the Canadian "Soo" Canal will be opened for traffic on Aug. 15 to vessels drawing 14 ft. of water and under.

Train Accident in France.

A derailment, by which twelve persons lost their lives and twenty-five were injured, was reported July 26 from St. Brieuc, Department of Côtes du Nord, France. A train heavily laden with pilgrims, who were returning from the shrine of Saint Dauray, was in some manner not yet explained thrown from the track, and several cars were wrecked.

Lake Notes.

There has been a blockade at the Sault St. Marie canal the past week, from the fact that the strike on the Marquette range has turned considerable tonnage that has been trading to Escanaba, on Lake Michigan, into the Lake Superior traffic. An average delay of 24 hours has been encountered each way, and this means not less than 20 per cent. of a vessel's time.

There is a decided increase in the coal movement up the lakes, and ore vessels, which have been going up light all season, are now taking coal cargoes. Rates from Lake Erie ports to the head of Lake Superior are 25 and 30 cents, and are more to intermediate and Lake Michigan ports.

Iron Ore Notes.

Some 11,000 tons of iron ore daily are going from the Duluth & Iron Range docks to Lake Erie and Chicago. From the dock of the Duluth, Missabe & Northern 8,000 tons is the daily movement. The Duluth & Winnipeg is shipping 2,500 tons a day. The Chicago & Northwestern and Wisconsin Central are sending out 15,000 tons a day together from Ashland. The Duluth, South Shore & Atlantic is shipping nothing and the Northwestern from Escanaba about 8,000 tons.

The Jungfrau Railroad.

Press dispatches say that the financing of the scheme for the construction of a railroad up the Jungfrau Mountain is assured, and the work will be begun in the latter part of the present year.

The International Congress Papers.

We have had many inquiries as to where the papers presented at the recent International Railroad Congress can be procured. They are published in the regular monthly issues of the Congress. This publication is entitled the "Bulletin of the International Commission of the Railroad Congress." It is published by P. Weissenbruch, 45 Rue du Poinçon, Brussels, Belgium. It is issued every month, and the annual volumes for the years 1887 to 1894 inclusive, have averaged 1,840 pages. The annual subscription is 18 francs within the postal union. Separate numbers are sold at the price of 1.5 francs (plus postage) for each 40 pages contained in the number. The publication of the reports presented at the recent meeting was begun early this year in the Bulletin, and will of course be continued until the publication is complete. A good many separate copies were printed for the special use of delegates, and it is possible that some of these could be obtained by writing to Mr. Weissenbruch.

Tracks in Chicago Streets.

Judge Adams, sitting in the District Court at Chicago, has granted a permanent injunction restraining the city from taking up the tracks of the Union Stock Yards & Transit Company, along 40th street from Clark street to the Lake shore. The residents along the boulevards crossed by this line recently secured the passage of an order by the City Council directing the Commissioner of Public Works to remove the tracks in case the Transit Company refused to do so. The Transit Company prayed an injunction. The opinion merely covers the charter rights of the company and the rights of the city in the premises. The fight will be carried to the Supreme Court by the property owners on the question of the right of the Transit Company to maintain its tracks along this street.

Assessment of Railroad Property in North Carolina

The North Carolina Railroad Commission has assessed the railroads for taxation as follows:

	Miles.	Value.
Southern Railway	1,063	$7,031,364
Atlantic Coast Line	717	6,55·,426
Seaboard Air Line	665	5,122,914
Others	1,172	5,639,295
Total	3,617	$24,501,899

The principal increases are: Raleigh & Augusta, from $6,000 to $9,000 per mile; Carolina Central (Hamlet to Monroe), from $8,000 to $9,000; Norfolk & Carolina, $8,000 to $8,500; Georgia, Carolina & Northern, $6,000 to $9,000; Aberdeen, from $3,000 to $3,500.

The new railroad for the year was: Willettsville & Powelsville, 11 miles; Moore County, 12 miles; Aberdeen & West End, 4 miles; Aberdeen & Rockfish, 5 miles; Winston, 10 miles.

RAILROAD LAW—NOTES OF DECISIONS.

Carriage of Goods and Injuries to Property.

The Supreme Court of Minnesota rules that where two fires, for one of which a railroad was responsible, mingled, it was liable for damage thereafter ensuing.[1]

In South Carolina it is held that under the statute making every railroad liable for the property of persons injured by fire from its locomotives, but allowing it to insure any such property, not only the insured may sue to recover for the loss, but also insurance companies which have been subrogated to the rights of insured against the company by paying the several amounts required by their respective policies on the property.[2]

In Texas it was said that the deviation by a carrier from the stipulated route, to save delay, because it was impassible by floods, does not render such carrier an insurer, and liable for delay caused by such deviation.[3]

In Pennsylvania a bank holding a draft, with bill of lading attached, for collection, permitted the drawee to take it up by a new draft, retaining the bill of lading as security, and to reship the goods. This was in accordance with a long course of dealing between them. The goods were delivered by the drawee's orders to a third party. The railroad had no notice at any time of the bill of lading, it having been issued by a transportation company. The Supreme Court holds that the railroad was not liable to the bank on such bill of lading.[4]

The Supreme Court of South Dakota says that in an action against a railroad for killing stock at a highway crossing, an eye-witness to the collision is not necessary to a recovery.[5]

Injuries to Passengers, Employees and Strangers.

In Texas it is held by the Supreme Court that, where a ticket agent, who has authority to sell both limited and unlimited tickets over a connecting line, gives a passenger a ticket which he takes without reading, and which recites on its face that it is limited, evidence that the passenger contracted for a ticket which would allow him stop over privileges is admissible, though the ticket also recites that no agent has authority to change the conditions thereof.[6]

It is also ruled that a stipulation on a ticket that the measure of damages in case of a breach of the contract of carriage shall be the amount of fare demanded by the conductor does not preclude a recovery for full damages for the wrongful ejection of the passenger from the train.[6]

In New York it is said that the evidence is sufficient to show that defendant was the carrier, where it appears that the plaintiff purchased her ticket from defendant, and that the car in which she was riding had defendant's name on it.[7]

In Alabama it is laid down by the Supreme Court that a conductor ejecting an intoxicated person must see that, considering the degree of intoxication, he is exposed to no unnecessary peril.[8]

In Texas it is held that a railroad is not liable for an injury resulting to a trespasser from an assault by its brakeman, in the absence of evidence that the brakeman was discharging a duty incident to his employment.[9]

In New York the Supreme Court rules that a railroad is not liable for injuries caused by the explosion of a torpedo placed on the track by a station agent, where it appears that the agent placed the torpedo on the track merely for the purpose of hearing the explosion, and not as a signal to any train, that torpedoes were not furnished to station agents for their own use, and that the rules of the railroad company forbade placing them near stations.[10]

The Supreme Court of Missouri holds that a switchman uncoupling cars in a yard is a fellow-servant of a locomotive engineer who injured him by an unexpected movement of the train in response to a signal from employees thereon.[11]

In Kansas it is held that a brakeman is not a fellow-servant of the station agent, who should see to the proper loading of cars, nor of the yard master, whose duty it is to see that cars are properly loaded.[12]

In the state of Washington the Supreme Court says that the mere fact that a crew of section men are ordered, in the night, to proceed to a crossing to unload a car load of rails, does not impose on the company a personal obligation to provide an unobstructed track for their hand car until it reaches its destination; and, when the headlight of a locomotive a mile and a half away is in plain view during the entire journey, there can be no recovery for an injury in a collision between the hand car and the locomotive, which was moving at the rate of only three or four miles per hour, and which could easily have been avoided by the removal of the car from the track.[13]

In the Federal Court it is held that one who drives across a railroad track without stopping to listen for a train, and is injured thereby, cannot recover for the injury, though the view of the track was obstructed by trees, and though he checked his horse's speed, and listened for a train, since, if he had stopped his horse altogether, he might have heard the train.[14]

In Nebraska, A was injured by his horse becoming frightened, after crossing a railroad track, by a car passing behind him. It appeared that, before crossing the track, A saw the car approaching on an incline track in charge of a brakeman in time to have stopped; that the horse was not frightened until the track had been safely crossed; that the brakeman did not slacken the speed of the car, but made no unnecessary noise therewith. The Supreme Court rules that, because of his own negligence A could not recover.[15]

The Supreme Court of North Carolina holds that though, by keeping a proper lookout on an engine, an intoxicated person lying on the track could have been seen in time to avoid killing him, recovery cannot be had, it having been impossible to prevent the accident after his discovery, as his negligence is concurrent with or subsequent to that of the engineer, and the proximate cause of the injury.[16]

In this state recovery cannot be had for the killing by a train of a trespasser on a railroad, notwithstanding his negligence, by reason of the fact that the train was not properly equipped with appliances for stopping it quickly, as the negligence which will allow recovery, notwithstanding that of deceased, must be subsequent to this.[16]

In Minnesota the rule that one who attempts to cross a railroad track without looking and listening, when by so doing, he may discover the danger from an approaching train, is guilty of negligence per se, does not apply to the case of one who is employed in a railroad yard, and whose duties frequently make it necessary for him to go on the tracks.[17]

In Indiana the findings in the verdict were that deceased entered onto defendant's track about half a mile in front of an approaching train going at about 20 miles an hour, and walked rapidly toward it. There was another person between deceased and the train, who stepped from the track in time to avoid being run over. Deceased, as he approached the train, waved his arms and hands above his head. The engineer saw the deceased at the time he entered on the track and signaled. There was no finding that the engineer's conduct was willful. The Superior Court rules that judgment was properly rendered for the defendant.[18]

[1] McClellan v. St. P., M. & M., 59 N. W. Rep., 978.
[2] Mobile Ins. Co. v. C. & G., 19 S. E. Rep., 858.
[3] Int. & G. N. v Wentworth, 27 S. W. Rep., 680.
[4] Nat. Bank of P. v. P. & R., 30 Atl. Rep., 28
[5] Sweet v. C., M. & St. P., 60 N. W. Rep., 77.
[6] G., H. & S. A. v. Kinnebrew, 27 S. W. Rep., 631.
[7] Kunzmann v. N. Y. & R. B., 29 N. Y. S., 327.
[8] Johnson v. L. & N., 16 South Rep., 75.
[9] T. & P. v Black, 27 S. W. Rep., 118.
[10] Smith v. N. Y. C. & H. R., 29 N. Y. S., 540.
[11] Rutledge v. M. P., 27 S. W. Rep., 327.
[12] A., T. & S. F. v. Seeley (Kan.), 37 Pac. Rep., 104.
[13] Cooney v. G. N., 37 Pac. Rep., 478.
[14] Littaur v. Narragansett Pier R. R., 61 Fed. Rep., 591.
[15] Stephens v. O. & R. V., 59 N. W. Rep., 557.
[16] Smith v. N. & S., 19 S. E. Rep., 863.
[17] Jordan v. C., St. P., M. & O., 59 N. W. Rep., 633.
[18] Barr v. C., St. L. & P., 37 N. E. Rep., 814.

LOCOMOTIVE BUILDING.

The Pittsburgh Locomotive Works has an order for two heavy locomotives for the Pittsburgh Junction Railroad. They will be similar to Nos. 8 and 9 recently built at these shops.

The first lot of the 12 new engines recently ordered by the Seaboard Air Line were received at Raleigh, N. C., last week from the Richmond Locomotive Works. They will be used in the passenger service on the vestibuled trains between Washington and Atlanta, known as the "Atlanta Special."

CAR BUILDING.

The Altoona shops of the Pennsylvania Railroad now have orders for building 750 new freight cars.

The Barney & Smith Car Company is building five postal cars for the Baltimore & Ohio Southwestern, on which the Buckeye Coupler is specified.

The Michigan-Peninsular Car Co. has just closed a contract for 500 standard gondola coal cars for the Cleveland, Lorain & Wheeling roads.

The receivers of the Philadelphia & Reading have received formal authority from the United States Court to make a contract with the Pullman Palace Car Co., for building 1,000 coal cars.

BRIDGE BUILDING.

Abbeville, La.—It is proposed to build a steel bridge with a 170-ft. draw span over the Vermilion River. Address W. W. Edwards.

Amsterdam, N. Y.—The plans for the iron work of the new bridge which is to be built over the New York Central tracks at Bridge street has been submitted to the Mayor and City Engineer and have been approved by them.

Baltimore, Md.—General Manager W. A. Moore, of the Baltimore & Lehigh road, has recommended to the Directors the building of a new iron bridge over Deer Creek north of Baltimore to replace the existing structure. The building of the bridge will probably be ordered at once.

Brockville, Ont.—Excavations have been commenced for the foundation of one of the piers for the International railroad bridge across the St. Lawrence River between Brockville and Morristown, N. Y. Engineer W. B. Smellie is in charge of the work.

Buffalo, N. Y.—The contract for the bridge over Buffalo Creek at Mill street has been secured by the Wisconsin Bridge Co., of Milwaukee, Wis., the contract price being $38,700. The bridge will be a steel structure with two spans.

Canadian Bridges.—The Dominion Parliament, which has just adjourned, voted the following appropriations towards the construction of bridges: For repairs to bridges, Ottawa City, $5,000; bridges across the Saskatchewan River at Edmonton, $25,000; swing bridge over Burlington channel, bridge over Pond Creek, $1,300.

Cincinnati, O.—The County Commissioners have approved plans for a bridge crossing Michigan Creek at Spring Road avenue. The bridge will cost about $47,600.

Cumberland, Md.—Nelson & Buchanan, of Chambersburgh, Pa., have the contract for a one-span highway bridge, 190 ft. long, over the Conedogwinet Creek, at Cumberland.

Denver, Col.—The Board of Works has approved the plans and specifications for a new bridge to be built over the Platte River at Almeda avenue at a cost of $1,800.

East Liverpool, O.—The East Liverpool Bridge Co. is to build a wire suspension bridge across the Ohio River. The necessary authority from the Secretary of War has already been granted, and the contract for the masonry and approaches has been let to William C. Jutte. The channel span of the bridge will be about 700 ft. long, and its total length, including approaches, will be about 1,700 ft.

Edmonton, N.W.T.—The Mayor of Edmonton, Northwest Territories, was in Ottawa last week urging assist-

ance from the Dominion Government towards the construction of the steel bridge shortly to be built across the Saskatchewan River, which it is estimated will cost $60,000.

Elmira, N. Y.—Last week the Bridge Committee and Common Council opened the bids for the erection of the two iron bridges which are to be built across the Chemung River at Walnut street and Madison avenue. They were as follows: Elmira Bridge Co., Limited, $109,745; Owego Bridge Co., $113,000; Pennsylvania Steel Co., $113,989; Union Bridge Co., Athens, $114,500; Havana Bridge Co., $114,700; Horseheads Bridge Co., $114,900. The first-named company's bid was accepted. Operations were begun this week and will be pushed as rapidly as possible, with the intention of having the bridges completed by Jan. 1, 1896. The Walnut street bridge will be 900 ft. long, with six spans, each 146 ft. The Madison avenue bridge will be 600 ft. long.

Hackensack, N. J.—Bids have been received for building two steel bridges at Woodcliff.

Jersey City, N. J.—Bids have been received for the construction of a bridge over Cornelison avenue at Montgomery street.

Lansing, Mich.—Authority has been given the City Clerk to advertise for bids for $25,000 of 4 per cent. bonds, the proceeds to be used in building a bridge at Michigan avenue over the Grand River.

Leitersburg, Md.—A new iron bridge is to be built over Antietam Creek at the Ohler-Knode Ford.

London, Ont. — The street railway company has awarded the contract for a bridge at York street to the Central Bridge & Engineering Co., of Peterboro. The work is to be completed by Sept. 14.

Montague, Mass.—A meeting was recently held here concerning the proposed bridge over Sawmill River at this place, and $5,000 was appropriated for it.

New Westminster, B. C.—The city council is negotiating with C. D. Rand for the construction of the Fraser River bridge, and it is probable an agreement will be reached at an early date.

Niagara Falls, N. Y.—Bids for the construction of the new bridge on Buffalo avenue, across Gill Creek, were received from the Horseheads Bridge Co., the Groton Bridge Co., Havana Bridge Co., Rochester Bridge Co., Penn Bridge Co., B P. Smith, of Rochester, and R. D. Young and John Sandstrum, of Niagara Falls. The award was deferred.

Parsons, Kan.—Bids will be received until Aug. 5 for building a 50 ft. bridge over Negro run, Fairview Township. Address J. F. Thompson, County Clerk.

Pecos Valley.—A contract has been given to Colonel John Hughes, of Fort Worth, Tex., for replacing all the wooden bridges throughout the length of this road with iron structures. The road is about 200 miles long from Eddy, N. M., to Roswell.

Pittsburgh.—The bids for the new arch bridge over Panther Hollow, in Schenley Park, were as follows: Bowman Bros., $198,900; Edgemore Bridge Co., $189,900; Pittsburgh Bridge Co., $187,133; Groton Bridge Co., $175,000; J. Gianini Co., $174,900, and the Shultz Bridge Co., $165,700. The last named company was awarded the contract.

St. John, N. B.—It is proposed to construct a three-girder bridge over Newman's Brook, to cost in the vicinity of $5,000.

St. Thomas, Ont.—The Lake Erie & Detroit River Railroad is to build a new steel bridge over the London & Port Stanley road, near St. Thomas. Although the contracts have not been formally signed, the steel necessary for the bridges has been ordered from Scotland by the Dominion Bridge Company, of Montreal.

Scranton, Pa.—The Common Council has instructed the City Engineer to prepare plans for a viaduct over the Delaware, Lackawanna & Western tracks on West Lackawanna avenue.

Syracuse, Kan.—The bridge across the Arkansas River was partially destroyed by a sudden rise of the stream last week. The two end spans were carried away, but the middle one was left intact.

Syracuse, N. Y.—Plans are being prepared for the foundations of a new bridge over the canal at Green street. The superstructure is being designed at Albany.

Throckmorton, Tex.—The flood of July 12 carried away the iron bridge across the Brazos River, in Throckmorton County. This was a new bridge which cost about $16,000.

Troy, N. C.—Aberdeen & West End Railroad has been completed to a point four miles from Troy and a long iron bridge will now be built 60 ft. above the river. Address for particulars, A. F. Page, President, Aberdeen & West End Railroad, Aberdeen, N. C.

Warren, Pa.—Bids for the steel highway bridge across the Allegheny River at this place will be received by L. T. Borchers until Aug. 20. Separate bids are desired for superstructure and substructure.

Warsaw, Mo.—It has been proposed to citizens of this place to construct a 370 ft. suspension bridge across the Osage River, to cost about $8,000. D. M. Eddy, of Stockton, Mo., will undertake to build the bridge if $1,000 bonus is raised.

Winnipeg.—The corporation of this city are calling for tenders to be received by J. C. Sproule, Chairman of Committee on Works, up to Aug. 15, for the erection of a steel superstructure for Osborne Street Bridge. Plans and specifications can be seen or obtained on application to the City Engineer.

MEETINGS AND ANNOUNCEMENTS.

Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

Chicago, St. Paul, Minneapolis & Omaha, 3½ per cent. on the preferred stock, payable Aug. 20.

Mahoning Coal, 3 per cent. on its common stock, payable Aug. 1.

New York Central & Hudson River, 1¼ per cent. on the capital stock of the Rome, Watertown & Ogdensburg Railroad will be paid by the New York Central & Hudson River Railroad, lessee, after Aug. 15.

Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

Chicago, Milwaukee & St. Paul, annual, Milwaukee, Wis., Sept. 21.

Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *New England Roadmasters' Association* will hold its annual meeting on Sept. 16.

The *Roadmasters' Association of America* will hold its annual meeting at St. Louis, Mo., Oct. 8.

The *American International Association of Railroad Superintendents of Bridges and Buildings* will hold its annual meeting at New Orleans, La., Oct. 15.

The *American Street Railway Association* will hold its annual meeting at Montreal, Que., Oct. 15.

The *Freight Claim Association* will hold its next meeting on Aug. 14 at New York City.

The *American Railway Association* will hold its fall meeting at New York City, Oct. 16.

The *American Association of General Baggage and Ticket Agents* will hold its semi-annual meeting at Boston, Sept. 17.

Illinois Central, semi-annual, 2½ per cent., payable Aug. 31.

Lake Erie & Western, quarterly, 1¼ per cent., payable Aug. 15.

Nashville, Chattanooga & St. Louis, 1 per cent. on its capital stock.

Pullman Palace Car Co., quarterly, $2 per share, payable Aug. 15.

The Engineers' and Architects' Association of Southern California meets each third Wednesday of the month in the Hall of the Chamber of Commerce, Los Angeles, Cal.

The Engineers' Society of Western New York holds regular meetings the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

The *Western Railway Club* meets in Chicago on the third Tuesday of each month, at 2 p m.

The *New York Railroad Club* meets at the rooms of the American Society of Mechanical Engineers, 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The *New England Railroad Club* meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Wednesday of each month.

The *Central Railway Club* meets at the Hotel Iroquois Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 2 p. m.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *Northwestern Railroad Club* meets at the Ryan Hotel, St. Paul, on the second Tuesday of each month, at 8 p. m.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2.30 p. m.

The *American Society of Civil Engineers* meets at the House of the Society, 127 East Twenty-third street New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Western Society of Engineers* meets on the first Tuesday in each month, at 8 p. m. The headquarters of the society are at 1736-1739 Monadnock Block, Chicago. The business meetings are held on the first Wednesday at its rooms. The meetings for the reading and discussion of papers are held on the third Wednesday at the Armour Institute, Thirty-third street and Armour avenue.

Master Car and Locomotive Painters' Association.

The programme of the annual convention of this association has just been issued. The convention will be held at the Grand Hotel, Cincinnati, Sept. 11, 12 and 13. The hotel rates will be $3 a day.

Traveling Engineers' Association.

Secretary W. O. Thompson, of Elkhart, Ind., has issued a circular, on behalf of a committee appointed at the last meeting, asking for facts and opinions as to the best manner of making reports of the conduct of engineers and firemen which will be suitable to put on record as indications of the character of the men. The circular is accompanied by a proposed form of blank, in which the qualifications of the engineman are to be noted under four heads—inspection, oiling, running and condition of engine; the fireman under three heads—firing, cleanliness and condition of engine: and the condition of the engine under four heads—wheels and bearings, valves, machinery, firebox and boiler. Under each one of these heads the traveling engineer can indicate by a figure—1, 2, 3, 4 or 5—whether his estimate is very good, good, medium, poor or very poor.

A circular has also been issued asking for information as to the best and most economical list of tools to be carried on an engine. Answers to this circular are to be sent to Mr. Charles Davis, Chairman of the Committee, 352 North Division street, Buffalo, N. Y.

Young Men's Christian Association.

The officers of the International Committee, whose headquarters are at 40 East Twenty-third street, New York City, have issued the call for the eighth International Conference of the Railroad Department of Young Men's Christian Associations, which will be held in Clifton Forge, Va., Sept. 13, 14 and 15. All members of railroad associations of North America, railroad men from unorganized points, interested railroad officials, state secretaries, and general secretaries from cities where railroad work is either organized or contemplated, are invited.

The Clifton Forge Association has offered to entertain this Conference, but owing to limited facilities they can only agree to provide free entertainment for five representatives from each Railroad Association and for railroad men coming from unorganized points. For the benefit of others a special rate of $1 a day has been secured at Gladys Inn, a hotel managed by the railroad company, and at Hotel Clifton. Applications for entertainment or hotel accommodations should be made to G. H. Winslow, Clifton Forge, by September 6.

Friday evening, the 13th, will be railroad official evening, when addresses will be delivered by M. E. Ingalls, John J. McCook and others.

On Monday the 15th, the Chesapeake & Ohio Railroad Company proposes to give the delegates a free excursion over the most interesting part of its line.

Railroad men should secure transportation over their own lines, and arrangements have been made for securing, through the International Committee, transportation from connecting lines.

The Chairman of the Railroad Committee is Mr. C. F. Cox, and the Secretary is Mr. C. J. Hicks.

Master Car Builders' Association.

The following are the subjects and committees for the convention to be held June, 1896:

Metal for Brake Shoes, Laboratory tests.—S. P. Bush, D. L. Barnes, Jno. W. Cloud.

In making final report this Committee to confer with the Executive Committee of the Committee on Road Tests of Brake Shoes of 1895.—R. H. Soule, A. E. Mitchell, W. S. Morris.

Automatic Couplers.—To advise what changes may be desired in the standard size of M. C. B. automatic coupler shanks, and to recommend a standard yoke or pocket strap for rear end attachment to cars: J. M. Wallis, A. E. Mitchell, J. T. Chamberlain, R. D. Wade, Wm. Garstang, T. G. Duncan, Thomas Kearsley.

Mounting Wheels.—To review the subject of mounting wheels and the standard check gage, together with the standard distance between wheels: J. N. Barr, R. E. Marshall, Pulaski Leeds, A. M. Waitt, J. C. Barber, J. H. McConnell, Thos. Sutherland.

Passenger Car Ends and Platforms.—To consider what improvements may be made in the construction of passenger car ends and platforms for increased strength in ordinary service and in emergencies: E. W. Grieves, C. A. Schroyer, T. A. Bissell, F. D. Adams, M. M. Martin, J. J. Hennessey, Samuel Porcher.

Axle, Journal Box, Bearing and Wedge for Cars of 80,000 lbs. capacity.—To propose standards with detail drawings of same: E D. Nelson, J. H. Rankin, Geo. Gibbs, Wm. Forsyth, John Hodge, J. E. Simons, F. W. Chaffee.

Metal Underframing for Freight Cars.—To discuss the extent to which metal may be used with economy and advantage; also the best forms: R. P. C. Sanderson, D. L. Barnes, Robt. McKenna, J. D. McIlwain, Clem. Hackney, John Player, J. R. Skinner.

Location of Air-Brake Cylinders on Freight Cars.—Having in view easy access for cleaning and repairing: James Macbeth, B. Haskell, A. C. Robson, Robert Gunn, F. B. Griffith, Joel West, H. C. McCarthy.

Freight Car Doors and Attachments.—To inform the Association as to the latest improvements and the best practice: F. H. Soule, B. E. Thomson, Chas. Waughop, J. J. Casey, Thos. Fildes, A. J. Cromwell, W. J. Robertson.

Handholds and Height of Drawbars.—To review the recommend practice in regard to handholds, and to advise whether greater uniformity can be secured in their location on cars of different types or classes, and to advise what will best conform to the requirements of the law. Also to advise what shop or repair practice will be most desirable, in order to have the height of drawbars at all times in conformity with requirements of law: H. S. Hayward, S. A. Charpiot, S. A. Crone, J. Mackenzie, Tracy Lyon, J. W. Marden, W. A. Nettleton, A. E. Mitchell, L. B. Paxson, S. Higgins, C. A. Schroyer.

Uncoupling Arrangements for M. C. B. Automatic Couplers.—To consider whether a standard uncoupling device is practicable, and the details thereof: G. L. Potter, C. E. Turner, R. C. Blackall, Samuel Irvin, R. M. Galbraith. G. W. West, G. B. Sollers.

PERSONAL.

—Mr. P. F. Brendler, of Yonkers, N. Y., has been appointed Chief Engineer of the Dunderberg Mountain Gravity Railroad.

—Assistant General Manager Schaff, of the Big Four road, has been made General Manager of the Louisville & Jeffersonville Bridge Co.

—Mr. George V. Massey, who has been appointed Assistant General Solicitor of the Pennsylvania, has been counsel for that company in the State of Delaware for several years. He is prominent in politics in Deleware.

—Mr. Richard Gray, General Traffic Manager of the Southern Pacific, has been granted a year's leave of absence with half pay; he is in bad health. Mr. Gray has been an officer in the Traffic department of the road for about 25 years.

—Mr. C. J. Klein has been appointed Superintendent of the terminals of the Louisville & Nashville at Louisville, succeeding Mr. E. H. Burch, who has resigned, and it is understood will accept a position in the transportation department of the Northern Railroad.

—Mr. Robert B. Langdon, a railroad contractor of some prominence in the Northwest, died at Minneapolis on July 29. Mr. Langdon at the time of his death was engaged in carrying out a contract for building an irrigation canal near Phœnix, Ariz., which amounted to nearly $2,000,000.

— Mr. E. D. Halsted, Secretary and Treasurer of the Missouri, Kansas & Texas Railway, of Texas, died at Dallas on July 22. Mr. Halsted had been sick only 18 days. He had been on this road only about three years, having been Paymaster on the Wisconsin Central up to 1892. He was 32 years old.

—Mr. N. M. Belden, a former railroad commissioner of Connecticut, died at Wilton in that State on July 28. Mr. Belden was educated as a civil engineer, but most of his time had been given to municipal work and land surveying, and he was not identified with railroad work to any extent. He was State Railroad Commissioner altogether for eight years.

—Mr. George B. Harris, who lately resigned as Assistant to the President of the Lehigh & Hudson River road, has gone to Reading, Pa., where he has a position as Engineer of the Reading Iron Company. Mr. Harris also held, on the Lehigh & Hudson River, the position of Superintendent of Tracks, Buildings and Bridges, which has been filled by the appointment of Mr. John E. Barrett.

—Mr. Robert D. Parsons has recently been appointed agent of the New York & Cuba Mail Steamship Co. (the Ward Line). This is a new office and has been created to develop the passenger traffic of the Ward Line which operates 10 ships, having lines to Nassau, Havana, the south side of Cuba, and other West Indian islands and to Mexico. Mr. Parsons has been connected with the company for about 15 years.

—Mr. Henry B. Seaman, M. Am. Soc. C. E., of Mount Vernon, N. Y., has been admitted to the New York State Bar. Mr. Seaman, who is in the service of the New York, New Haven & Hartford, has had charge of the extensive improvements connected with the four-tracking of the road between Mount Vernon and New Rochelle during the past four years, and his study of the law was begun as a result of his experience there with the varied legal complications with municipalities, land owners and contractors.

—The retirement of Mr. George P. Neele, the veteran General Superintendent of the London & North Western, took effect Aug. 1, and the *Railway News* of London publishes portraits of Mr. Neele and Mr. Robert Turnbull, his successor. Mr. Neele began railroad service in 1847 and served with a number of smaller companies before coming to the London & North Western. He was promoted through various stages of the operating department and became General Superintendent in 1862. Mr. Turnbull has been in the service 25 years, having

begun in the freight department at Rugby. He has been a subordinate in the General Manager's department and Assistant Superintendent at Liverpool.

—Mr. Edmund Smith, a former Treasurer and Vice-President of the Pennsylvania Railroad, died at a hospital in New York City on Wednesday last. Mr. Smith was stricken with apoplexy at an elevated railroad station in New York, and remained unconscious from the time of his removal to the hospital. When Mr. Smith retired from the service of the Pennsylvania Railroad five years ago he was First Vice-President. He had been elected to that position on the retirement of Mr. Cassatt and previously had been Treasurer and Second Vice-President. Before being elected Treasurer he had been Secretary of the company. His earlier service with the company was varied and he had occupied positions in the freight department, the station service and in the engineering department.

—Lieutenant Charles Hine, of the U. S. Army, who has for some time been stationed at Fort Thomas, Ky., opposite Cincinnati, recently resigned his place in the army, and is now a brakeman on the Chicago Division of the Cleveland, Cincinnati, Chicago & St. Louis Railroad. Lieutenant Hine is a graduate of West Point, and of the Cincinnati law school, and was one of the most popular young officers at Fort Thomas; but desiring to make himself a railroad man he has begun in the lower ranks so as to thoroughly fit himself for any position. He has already had an excellent training as a civil engineer. An officer of the road informs us that Mr. Hine does not expect to be advanced on account of any influence which he may bring to bear, but is simply aiming to perfect himself as a railroad man, so that his own merits will make a good showing.

—Colonel E. K. Sibley, formerly a well-known railroad officer, died at Victoria, B. C., last week having been taken ill on the steamer when returning from a visit to Alaska. Colonel Sibley retired from railroad service a number of years ago and has since resided in the East, being for a time a member of the banking firm of Marquand & Parmley, of New York City. At the time of his death he was a director of the New York, Ontario & Western, of the American Surety Co., the Safety Car Heating & Lighting Co., and other financial and manufacturing corporations. His railroad service was mostly on western railroads. His first position was in freight service on the Iron Mountain Railroad, of which he became Assistant General Freight Agent. In 1881 he became General Manager of the Memphis & Little Rock road and was appointed receiver a year later, retaining both offices until 1884. Afterward he was made Assistant to the Third Vice-President of the Missouri Pacific, and when he resigned that position he became a member of the Board of Arbitration of the Southern Railway & Steamship Association and also of the Southern Passenger Association.

—The death of Mr. A. N. Towne, which was noted in these columns July 19, was due to heart disease, Mr. Towne having been at his office, apparently in his usual health, the day before he died. The directors of the Southern Pacific met in San Francisco the next day after his death and passed resolutions of sympathy with the family. These resolutions say, among other things:

> The record of his advancement contains every grade of official relation, and the time of his services for the railroad lines now operated by this company, including those formerly operated by the Central Pacific, has extended beyond a quarter of a century. The success which characterized the employment of his great executive abilities in the management of these properties followed his thorough knowledge of the controlling principles as well as of the practical details relating to the subjects of traffic and transportation.
>
> In the direction of those subject to his command he combined courtesy with firmness, and with the enforcement of discipline considerate forbearance. In his intercourse with his fellow-officials he manifested that helpfulness which is indicative of manliness of character, and which made the discharge of concurrent administrative duties a pleasure, and for all conditions in life he entertained a genuine and sincere sympathy.
>
> As a citizen he was patriotic, broad minded and public-spirited. As a friend he was devoted and loyal. With none of the duties which life imposes upon men evaded, with no covenant of friendship broken, with no trust betrayed, his death closes a useful, brave and honorable life.

ELECTIONS AND APPOINTMENTS.

Altoona & Phillipsburgh Connecting.—George M. Case, General Freight and Passenger Agent, has been appointed Superintendent, in charge of the road, Mr. W. T. Forsyth, General Manager, having resigned. The office is at Philipsburgh, Pa.

Chicago, Iowa & Minnesota.—E. S Ellsworth, of Iowa Falls, has been elected President of this road, succeeding John Porter, of Eldora, who becomes Vice-President.

Georgia & Alabama.—The directors of this company, the reorganized Savannah, Americus & Montgomery line, met at Savannah, Ga., July 29, and elected John S. Williams, of Richmond, Va., President; Cecil Gabbett, of Americus, Ga., Vice-President and General Manager; Gen. Wilcox Brown, of Baltimore, Treasurer; and W. Mackall, of Savannah, Secretary.

Great Northern.—The Western passenger and freight departments are being separated, and in furtherance of this policy the office of General Western Passenger Agent will be created, and R. C. Stevens, General Agent of the passenger and freight departments in Seattle, will be promoted to the new position, with office at Seattle.

Kalamazoo Terminal.—The following officers have been elected: President, M. H. Lane; Vice-President, F. B. Lay; Secretary, E. S. Roos; Treasurer, F. B. Lay; General Manager, M. H. Lane.

Louisville & Nashville.—C. J. Klein has been appointed Superintendent in charge of terminal facilities of the L., C. & L. division and Louisville division at Louisville, East Louisville and South Louisville, including the Railway transfer and the Louisville, Harrod's Creek and Westport Railroad, vice E. H. Burch, resigned.

New York & Pennsylvania.—The directors of this company met in Hornellsville, N. Y., July 24, and elected the following officers: William Cobb, Spring Mills, N.Y., President; Benton McConnell, Hornellsville, Vice-President; I. W. Near, Hornellsville, Secretary; W. L. Richardson, Hornellsville, Treasurer; M. S. Chase, Whitesville, Auditor.

Pennsylvania.—George V. Massey, of Dover, Del., has been appointed Assistant General Solicitor.

Rutland.—At the annual meeting in Rutland, Vt., July 26, the old Board of Directors was re-elected as follows: Percival W. Clement, George H. Ball, John W. Stewart, Horace G. Young, Chester Griswold, David Wilcox, Edgar Harding, Charles A. Walker and Walace C. Clement.

Southern Railway.—Mr. Benjamin Thompson has been appointed Assistant Engineer with temporary headquarters at Greensboro, N. C.

Tacoma & Lake City.—The directors at the annual meeting in Tacoma re-elected the old officers and trustees. President, S. H. H. Clark, of St. Louis; Secretary, Alexander Miller, of Boston; Manager, E. E. Ellis; Trustees, R. G. Hudson, R. W. Baxter, W. H. Effinger and E. E. Ellis.

Trinity, Cameron & Western.—D. H. Snyder has succeeded to the presideney of this road, vice President E. Taylor, who died recently.

RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

Chicago, Burlington & Quincy.—It is again stated that the company has decided to build to Yellowstone Park, and will ask for the right of way through the park at the next session of Congress.

Chicago, Iowa & Minnesota.—A recent change in the officers of this company by which E. S. Ellsworth, of Iowa Falls, has been elected President, has revived interest in the project. It was organized about a year ago to build an extension of the Chicago, Iowa & Dakota from Eldora northwest to Iowa Falls and the Minnesota state line. A number of the incorporators were interested in the former road, but the company was entirely a distinct corporation. The line has been surveyed and it is understood that there is some chance of the company making financial arrangements to undertake the work this season.

Chicago & Kalamazoo Terminal.—President H. M. Lane, of this company, which proposes to build a terminal system at Kalamazoo, Mich., announces that the first of the contracts for building the road will probably be let during the summer. The company at present has about 90 men at work on construction. The system of terminal tracks which it is proposed to build will aggregate over 50 miles, but the work which it is now contemplated to undertake this season is planned on a much less extensive scale. When the company's bonds have been placed work will be started on the general plan. The company owns factory sites along most of its proposed line, which will be offered to manufacturers for the establishment of plants along the proposed line. Mr. Lane, the President, is General Manager of the company and the Chief Engineer is F. C. Balch, who has built a number of small railroads in Michigan.

Coast Railway of Nova Scotia.—L. H. Wheaton, Chief Engineer of this road, writes that 90 miles of it are under contract for construction. Twenty-three miles are now ready for track, the rails for which have been ordered from England. Contracts have been made with the Central Bridge Co., of Peterboro, Ont., for steel bridges for this division (Yarmouth to Lockeport); also with Warren Taylor, of Salisbury, N. B., for ties and H. Townsend, of New Glasgow, N. S., for masonry work. All of these contracts are now being carried on. The road is being built by the Nova Scotia Development Co. along the southern coast of Nova Scotia, from Yarmouth southeast 90 miles to Shelburne and Lockeport, N. S. Thomas Robertson is President of the company.

Colorado, Utah & Wyoming.—This company filed a charter in Wyoming last week, a land company of the same name being incorporated at the same time. The company proposes to construct lines from Rawlins, Wyo., to Craig, Routt County, Col., and thence via Yampa Valley to Ashley, Utah, and a line from Rawlins north to the Seminole Mountains and to the mouth of the Sweetwater River. The directors named are E. H. Saltiel, A. M. Ghost, R. F. Weitbrec, E. A. Clifford, of Denver; J. W. Harrison, St. Louis, and K. Mendell, New York.

Columbus, Huntingdon & Guyandotte —This road, in West Virginia, which will open up a rich timber and coal region in that section, will begin the work of construction at once. An effort was made at Central City, West Va., last week to get Judge Harvey to grant an injunction to prohibit the County Commissioners from issuing the $50,000 of bonds, voted to assist in the construction of the road up the Guyandotte River, but the court refused to grant the injunction.

Corral Hollow.—This company was organized at Stockton, Cal., some weeks ago to build a railroad of about 40 miles from that town to valuable coal mines owned by the incorporators. The company has been delayed insecuring right of way through the city of Stockton, but it was expected that the City Council would give the necessary authority at its meeting on July 29, and the projectors then propose to begin construction at once. The contract for the rails for the line has already been made with the Carnegie mills.

Delaware, Lackawanna & Western.—A report from Dansville states that the company is surveying a route from that point north through Scottsburg, and thence following the shore of Conesus Lake into Rochester.

Delaware Valley.—It is now said that a steam railroad is to be built in place of the defunct Delaware Valley Electric Railroad and run between East Stroudsburg and Port Jervis. A surveying corps has started to survey a route from Dingman's to Matamoras. The old route from East Stroudsburg to Matamoras as surveyed for the electric road will be used to that place. Simon Griedberger is president of the railroad company.

Duluth & North Dakota.—The farmers of the northeastern part of North Dakota, in the Red River Valley, have long been talking about building an independent road to Duluth and lake navigation, though this district is now reached by the Northern Pacific and Great Northern lines. Because of the suggested consolidation this feeling is more intense than ever. Until last year, however, nothing had been done by the farmers looking toward getting such a road as they thought they needed. Then D. W. Hines, a farmer, of Drayton, N. Dak., interested himself in the idea and took up the project. He had no money, but unbounded faith. Last fall he purchased tie timber lands and set men at work, cutting over 30,000 ties during the winter, which are now ready to be floated to the point desired. The land and work was partially paid for in stock of the road and the men were given provisions and clothing, bought for stock and a little cash, at the towns near by. At the same time Mr. Hines made arrangements for right of way and secured deeds to the land required for nearly 100 miles, paying for the same, when it was not freely given, in stock. This spring grading contracts were let to farmers of that section, who had little or nothing to do between the wheat planting and the harvest, and these men have now graded more than 100 miles of line, taking their pay in stock. It is claimed that not less than 200 miles will have been graded and the Red River bridged before the frost. The country is very level and presents no obstacles to the work now being done. All the work so far has been done in the northeastern county of North Dakota, Pembina, and the Minnesota counties adjoining. The line is expected to run in a southeasterly direction from the Red River, through some of the great wheat-producing counties of Minnesota, to a connection with some road running to Duluth, and Mr. Hines has had conferences with the officials of the Duluth & Winnipeg with a view to connecting with that line 100 miles northwest of Duluth. It begins to look as if the enterprise might be of some importance, as far as building a road is concerned, at least. A number of townships along the line are arranging to vote aid, and bonds have been voted by at least two small towns to the amount of $10,000. Farmers through whose land the road goes are assessed by Mr. Hines at the rate of $5 for one 160-acre tract, and $2 for each additional tract of the same size. They are given assurances that the road will haul wheat to Duluth at not over 1 cent per ton per mile. Not only have farmers given this amount cheerfully, but Eastern loan companies, who have come into possession of land, have done the same. The 30,000 ties cut last winter were made and put on the river bank for $2,100. The grading has been taken by farmers at from 7 to 10 cents per yard, which is said to be from 50 to 33 per cent. less than has been paid by the companies that have built in that section. Mr. Hines has so far refused to sell stock except as needed and to those who have done work, and then only at par. The whole country through which it is proposed to run is enthusiastic in its hopes for the road, and it is not impossible that, if the crop that now appears certain, is harvested, enough money may be subscribed by individuals and corporate communities to build and lay the track on the entire line.

Hendersonville & Brevard.—In a note published in this column on July 15 it was stated that the laborers on the grading had quit work because their wages were long overdue. We have learned that this statement was entirely erroneous. The construction work on the road has continued without any interruption of this kind. Mr. McNeely, of the firm of Warren, Jenks & McNeely, which has the contract for building the 22 miles of road now under construction, states that each payroll has been met when due since the work was begun early in the spring and that all contracts made by the firm have been carried out. The road is now practically completed. It has been built from Hendersonville west to Brevard in Transylvania County in the western part of North Carolina and extends through a mountainous country.

Intercolonial.—The Dominion parliament has just voted $125,000 to provide increased accommodation in connection with the road at Halifax, also the sum of $100,000 on account of a branch line from the Intercolonial, between Windsor Junction and Bedford to Dartmouth, near Halifax. For increased accommodation at Sidney, Cape Breton, the sum of $20,000 was voted.

Iron Mountain.—The Chief Engineer of this new California road, the incorporation of which was noted last week, is M. M. O'Shaughnessy, Crocker Building, San Francisco. The general office of the company is at Redding, Cal. The proposed railroad will join the Southern Pacific at Spring Creek about five miles north of Redding. At that point the Mountain Mines Co., which is the chief owner of the stock of the new road, will build a smelter with a capacity of 1,000 tons of ore a day.

Kansas City, Pittsburgh & Gulf.—This company has awarded the contract to the Pittsburgh Bridge Co. for 15 spans of bridge work to be used on the line now under construction. Nine spans will be 50-ft. deck girders, two spans 79-ft. girders, four pin spans, two 100 ft. long and two 200 ft. long. J. A. L. Waddue is consulting engineer.

Mexico. Cuernavaca & Pacific.—This road has just been completed to Las Tres Marias, a distance of 74 kilometers from the City of Mexico, and the construction of the line west of tha city is being vigorously pushed. Col. J. H. Hampson, President of the road, states that the prospects are bright for the building of the line to the port of Acapulco, on the Pacific Coast, after Cuernavaca has been reached.

New Roads.—Some capitalists are considering seriously of building a narrow gage, steam railroad from Ukiah, Cal., the terminus of the San Francisco & North Pacific to Lakeport, a town on Clear Lake, a distance of 30 miles.

A survey has been completed for a new road between Eldorado and Harwood, Mo., by a local engineer, Colonel McPherson. The business men of Nevado, Mo., are now endeavoring to induce the projectors to extend the line to reach that town which is about 14 miles south of Harwood. The line as now located is about 10 miles long from Harwood on the Missouri, Kansas & Texas to Eldorado Springs in the northwestern part of Cedar County. The latter town has voted $12,000 to the stock of the new company. The projectors have agreed to build a line between Harwood and Eldorado Springs before winter. The town of Nevada at present has a connection with Harwood by the Missouri, Kansas & Texas, so that a new line to Nevada would be parallel to that road. The necessity for the construction of such a line hardly seems apparent.

Ottawa, Arnprior & Parry Sound.—Chief Engineer G. A. Mountain states that grading on this railroad is completed to Georgian Bay. Thirty-five miles will be completed this summer, over 2,000 men being now employed on the construction. Next year there will only be 40 miles to be built between the eastern and western sections of the road to complete the line to Parry Sound. This section is very mountainous.

Pan-American.—A call has been issued for a meeting of the stockholders of this road at Victoria, Tex., on Aug. 23, for the purpose of reorganizing the company with a view to resuming construction work. This road is projected from Victoria, Tex., to Corpus Cristi and thence to Brownsville. Several miles of the line was graded about a year ago, but work has since been suspended.

Pennsylvania Midland.—Tracklaying was resumed this week on the line between Ashtola and Osterburg, Pa. About 200 men are at work. This line is a relocation of portions of the line of the South Mountain road between Harrisburg and Slatington, Pa. The starting point of the road is at Cessna, Pa., and its projected terminal points are Hyndman, in Bedford County, and Altoona, in Blair County. There is in addition a branch line from Osterburg to Ashtola, 20 miles in length. J. M. Africa is the Chief Engineer, with headquarters at Huntingdon, Pa.

Portland Extension.—This company has been organized at Westbrook, Me., to build a road from Westbrook to Gorham, four miles. The directors are William G

Davis, W. R. Wood, C. F. Libby, of Portland; E. A. Newman, of Deering; H. N. Wheeler, of Brooklyn. The Maine Railroad Commissioners have been asked to approve the location, and, if authority is granted, it is stated that work will commence at once.

Timber Belt & Commercial Railway Co.—This company, of which J. B. Moore is President, has been organized to develop coal and hard wood timber land in Arkansas. The road will be about 30 miles long.

Toronto, Hamilton & Buffalo.—The firm of George S. Good & Co., contractors, of Pennsylvania, whose chief officers are at Lock Haven, Pa., are interested in the contract for the extension of this road from Hamilton to Welland, Ont., 40 miles. This section of the road is being built to carry out an agreement with the Michigan Central and Canadian Pacific which will run trains over the new line as soon as completed. George S. Good & Co. are at present building the Middle Division of the Choctaw, Oklahoma & Gulf road in the Indian Territory. This work is now about completed, and the outfit used on that work will immediately be transferred to Ontario to build the line between Hamilton and Welland.

West Shore.—Articles of incorporation of this road, which is projected to run from San Francisco south along the sea coast to Santa Cruz, Cal., were filed on July 12. The capital of the company is $2,000,000. The President is C. M. Sanger and the Secretary is J. W. Eisenfurth. R. S. Thornton is Treasurer. The length of the line is about 70 miles. The company has its general office n the Crocker Building, San Francisco.

Washington County.—On July 29 an election was held in Washington County, Me., to vote on the proposition of the projectors asking for a subscription of $500,000 to the company's preferred stock to aid in building the road through Washington County. The returns received from the various towns show that the vote was largely in favor of issuing the county bonds for this stock. In addition to the county subscription to the stock the projectors ask for additional subscriptions for the stock to amount to $200,000, but most of these subscriptions have been secured, and as the county has voted in favor of the road positive statements are made that a contract will be made at once for constructing the road and that work will begin this season. George B. Wescott and James Mitchell, railroad contractors of Portland, Me., who have done much railroad construction in that state for the last few years, have agreed to accept the contract for the construction of the road with these two conditions—the county subscription of $500,000 to the stock and the private subscriptions for $200,000 are complied with. The road has been talked of for a number of years and is a reorganization of the old Maine Shore Line project. The line is to be built from a connection with the Maine Central across Washington County as near the coast line as practicable to Calais and Eastport on the eastern boundary line of Maine. George A. Curran, of Portland, Me., is President of the new company and the projectors include S. H. Leavitt, S. D. Leavitt, N. A. Nutt, G. A. Murchie, E. B. Curtis and T. W. Cooper.

West Side.—A charter was issued to this company at Harrisburg July 27. The line is to extend from the confluence of Little Saw Mill Run and Big Saw Mill Run, Allegheny County, to a point on the Monongahela River, at Monongahela City, Washington County, 20 miles. The capital is to be $200,000. The President is James D. Callery, of Pittsburgh, and the directors are William J. Burns, Albert L. Schultz, Eugene S. Reilly, William V. Callery, John D. Scully and George W. Crawford. The "West Side" will be the new name under which the old Little Saw Mill Run road will be operated. The road runs now from the West End to Banksville. The new line will be built from the latter town to a point north of Monongahela, about 14 miles. The survey has been completed.

GENERAL RAILROAD NEWS.

Augusta Southern.—The widening of the gage of the road has been completed, and commencing July 24 has been operated as a standard gage line. This improvement will open up a large territory, on the completion of the Macon, Dublin & Savannah, to Augusta merchants and shippers.

Atlantic Short Line.—Receiver John R. Young was recently authorized by the United States Court to issue receiver's bonds for building and equipping a line from Burton to Stillmore, Ga., to connect with the Savannah, Americus & Montgomery road, provided no sale of the road to the Macon & Dublin could be effected. An agreement said to be satisfactory to all except about 10 per cent. of the bondholders, has been reached, and the court will be asked to fix an upset price in accordance with this agreement, and order the property sold.

Black Hills & Wyoming.—The United States Government has instituted proceedings against this road to annul its charter. The laws provide that a railroad which has secured right of way over government land shall complete such road within five years. This law has not been complied with, hence the suit. The Fremont, Elkhorn & Missouri River road has built its line over part of the right of way in question and has been sued by the Black Hills & Wyoming Co., for $100,000, for appropriation of the latter's right of way. Judge C. G. Bennett, of the Circuit Court, is referee in the case and has the matter under advisement.

Boston & Albany.—The annual report of the company for the year ending June 30, 1895, compares with previous years as follows:

	1894-5.	1893-4.	1892-3.	1891-2.
Pass. earn	$3,809,355	$3,902.724	$4,234,029	$4,018 100
Freight earn	4,136,405	4,046.900	4,883,349	4,725,912
Mails, etc	1,185,105	1,240,651	1,047,497	1,119,303
Total gross earn..	$9,130,866	$9,190.277	$10,169.875	$9,863,316
Oper. exp	6 579,361	6,720.288	7,750,089	7,403,183
Net. earn	2,551,505	2,469,989	2,419,786	2,460,133
Int., div. & rentals.	2,531.150	2,459,410	2,390,900	2,395,067
Surplus	20,355	10.579	28.886	65,066
Total surplus	182,049	161,694	151,115	122,229

Charleston, Cincinnati & Chicago.—Suit was recently brought against Unicoi County, Tenn., to compel the issuance of bonds amounting to $25,000 that had been voted to the company. The court found that the railroad company was chartered under the laws of South Carolina and North Carolina at the time the subscription was voted in 1888, and that the company held no charter under Tennessee laws. It was decreed that the company was a foreign corporation, and the bonds void.

Duluth & Iron Range.—A short time ago this railroad, a State land grant road of Minnesota, selected the balance of its 600,000 acre grant, and applied to the State Auditor for the deeds to over 400,000 acres. These the auditor refused to give, claiming that the road had not been completed until after the expiration of the time named in the grant, and that the line was not on the originally laid out route. This was notwithstanding the fact that the State has never taken action forfeiting the grant, and in view of decisions of the Supreme Court that no grant can be cancelled without express action by the State Legislature. The Auditor applied to the Attorney-General and he promptly decided in favor of the road. Now the Auditor refuses to abide by the decision, and the road will be obliged to take the initiative in getting its grant. The 400,000 acres include much farming land, pine and hardwood tracts, and some land supposed to be valuable for minerals. Its value is undoubtedly several million dollars.

Georgia & Alabama.—The articles of incorporation of this company, which is a reorganization of the Savannah, Americus & Montgomery, were formally filed in Georgia last week. The capital stock of the new company is placed at $3,470,000. The names of the directors and officers of the new company are given in another column. The plan of reorganization of the Savannah, Americus & Montgomery provided for the issue of securities of the new company to provide a line into Savannah, Ga. The company now operates a line to Lyons, within 30 miles of Savannah, the road east of Lyons into Savannah being owned by the Central of Georgia. The officers state that if no satisfactory arrangements can be made for the purchase of this 30 miles of line that the company is prepared to build its own line into Savannah.

North Carolina.—The lease of this road by the Southern Railway will not expire for six years (1901), but the Southern people and the directors on the part of the State of North Carolina (which owns three-fourths of the $3,000,000 stock of the road) are already agitating the question of the renewal of the lease. This road extends from Goldsboro, via Raleigh and Greensboro, to Charlotte, N. C., a distance of about 300 miles, and is a valuable property. At present, that part of the road extending from Greensboro to Charlotte, is a part of the Southern's main line. In making Norfolk, Va., its deep water terminus, it is the intention of the Southern Railway to enter Norfolk over the tracks of the North Carolina Railroad from Greensboro, via Raleigh to Selma, N. C., and thence over the Atlantic Coast Line's Norfolk & Carolina road, so that, under that arrangement, the whole of the mileage of the North Carolina road (with the exception of the few miles between Selma and Goldsboro) would become a part of an important through main line. The track and many of the bridges, in that event, between Greensboro and Selma, would have to be replaced by heavier rails and stronger structures; and so it becomes an important matter with the Southern company to know whether it will be able to renew the lease six years hence on the present or other favorable terms, before making these costly improvements. A conference was held at Raleigh, N. C., between Second Vice-President A. B. Andrews and a committee of directors of the North Carolina road. Colonel Andrews is said to have offered to renew the lease for 99 years on the terms of the present lease, which includes the payment of an annual rental of $273,000. The committee was not satisfied with this offer and will so report to the Board of Directors at a meeting to be held in a few days. Considerable opposition is already being manifested against any renewal of the lease now, even if the Southern Railway agreed to pay more—say 7 per cent. instead of 6½ per cent. on the bonds of the road (which is in effect the price of the lease now) and which, it is stated, the directors would demand. And, it is now stated, on good authority, that the Seaboard Air Line desires to have an opportunity to bid on the property when the present lease expires. On the side of the Southern Railway it is said that that system is not compelled to use the North Carolina tracks in order to get into Norfolk; that it could build a link from Mocksville to Mooresville, N. C., and go to Norfolk over that route, and use the Atlantic & Danville road, too.

Oregon Pacific.—The Oregon Supreme Court has affirmed the decision of the lower court in the sale of the road at public auction to Bonner & Hammond, of Missoula, Montana, in December last, for $1,000,000 to satisfy the claims of creditors, which amount to many times this sum. The bonded indebtedness of the road was about $11,000,000.

Southern.—The earnings of the company for the year ending June 30, 1895, issued this week, make the following comparisons with the previous year:

	1895.	1894.	Inc. or Dec.
Gross earn	$17,114.791	$16,613,298	I. $471,493
Exp. oper. and taxes	12,062,854	12,345,627	D. 282,773
Net earn	$5,051,937	$4,297,671	I. $754,266
P. c. exp. to earn	70.5	74.2	

The above statement includes only 11 months' operations of the lines formerly known as the Charlotte, Columbia & Augusta, the Columbia & Greenville, and the East Tennessee, Virginia & Georgia, and 10 months' operations of the lines formerly known as the Georgia Pacific and the Louisville Southern, all now embraced in the system. The following statement shows the results of operation of all lines now in the Southern Railway for the full 12 months:

	1895.	1894.	Inc. or Dec.
Gross earn	$17,959,119	$17,548,685	I. $410,434
Oper. exp	12,790,522	13,190,470	D. 399,948
Net earn	$5,168,597	$4,358,215	I. $810,382
P. c. of exp. to earn	71.2	75.1	

The company reports gross earnings for June of $1,324,866, an increase of $84,687 as compared with the same month of last year, and net $164,681, an increase of $108,974.

TRAFFIC.

Traffic Notes.

The weighing and inspection bureaus of the trunk lines and the Central Traffic Association made $170,556 in the month of May.

The Alexandria Bay Steamboat Co. has sued the New York Central for $25,000, alleging that that road has given unlawful preferences to a rival steamboat company.

The Houston & Texas Central and the Southern Pacific, in Texas, now sell 2,000-mile tickets, good on either road, for $50 each. The tickets are good also on the San Antonio & Aransas Pass and the Austin & Northwestern.

The reduction in the freight rate on anthracite coal to Buffalo from $2 a ton to $1.75, heretofore announced by the Lackawanna, has now been met by the other lines, tariffs having been issued to go into effect Aug. 5.

The Secretary of Agriculture has received complaints that certain Western roads violate the law concerning the transportation of live stock, confining animals more than 28 hours and failing to give them sufficient rest when unloaded, and he has issued a circular to all roads.

The Long Island Railroad has made a reduction in passenger fares on the North Shore Division, in consequence of the competition of electric street car lines. The Philadelphia & Reading has reduced passenger rates to points on the Chester Valley Branch. This line competes with the main line of the Pennsylvania, on which fares were recently reduced.

The Conneaut & Port Dover car ferry for carrying loaded freight cars across Lake Erie is about to be opened, the first boat having been lately launched at the yard of the Craig Shipbuilding Co., Toledo. This ferry, connecting the Pittsburgh, Shenango & Lake Erie with the Grand Trunk, and established chiefly for carrying coal, was described in the *Railroad Gazette* of Jan. 4.

The Railroad Commissioners of Missouri have formally notified the Missouri, Kansas & Texas Railroad that no additional charge shall be made for carrying passengers or freight across the Missouri River bridge at Boonville. The tariffs of the road include an arbitrary of 25 cents per passenger, and from 2 cents to 5 cents per 100 lbs. for freight over the bridge. The Commissioners hold that under sections 2,673 and 2,675 of the laws of 1889 the bridge must be considered the same as any other portion of the line of the road of equal length, and the tariff of maximum rates prescribed by the Commission must apply.

The Southern Pacific recently made a reduction in the round trip fares from Los Angeles and other towns to Santa Barbara, Cal., the rates being about half the regular prices. This seems to have been such an unheard of thing in that region that "Jubilant Santa Barbara," as the headline has it, indulged in festivities for a week. According to the newspaper report there was to be a grand concert on the Boulevard by two bands, a bicycle meet, a grand Spanish tournament, with characteristic games, feats of horsemanship, lassoing wild bulls from San Marcos rancho, breaking and riding bucking bronchos.

Chicago Traffic Matters.

CHICAGO, July 31, 1895.

The meeting of general passenger agents held here last week soon discovered that it was useless to try to form any association east of the Missouri River until an agreement west of there had been signed. A general understanding was arrived at regarding the trans-Missouri business and then the question of the Southwestern business was taken up. The trouble in this portion of the territory is over Texas rates, particularly the one fare round-trip rates between Forth Worth and Kansas City. It was proposed to call a meeting of the Texas lines and go ahead and form an agreement, and then take up the Fort Worth matter. To this the Missouri, Kansas & Texas demurred, refusing to attend any meeting until this question was settled. This incensed the general passenger agents of the other Texas lines, and they proceeded to score the Missouri, Kansas & Texas in an open letter, charging it with having caused the demoralization, and willfully using this as an excuse for not joining an agreement, hoping thereby to continue the present demoralizing tactics. Considerable bad blood has been stirred up and the outlook for an agreement is not promising, although a meeting will be held at St. Louis to morrow to discuss the situation.

This leads me to note the peculiar situation of traffic matters in this territory. The freight association collapsed because the Missouri Pacific would not harmonize with the other roads. Now the Missouri Pacific is joining with the others in an attempt to form a passenger association, and the Missouri, Kansas & Texas is in opposition. As a prominent official said to me the other day, it looks mightily as though nobody really wants to sign any agreement, for as soon as one line agrees some other line discovers that there is something that must be "fixed" before *it* can join; and so it goes. The funny part of the whole thing is that the passenger agents have been holding meetings for four months under a resolution solemnly passed by the presidents *ordering* them to make an agreement forthwith.

A proposition is pending before the meeting of the Classification Committee to reduce the minimum weights of carload shipments on a considerable number of bulky commodities. The proposition came originally from the Chicago, Milwaukee & St. Paul which proposes to reduce the minimums on some four hundred commodities. The matter was referred to a special committee of the Western Freight Association who reported favorably as to about 100 of the commodities. The request of the St. Paul and the report of the special committee were both placed before the meeting of the Western Classification Committee last week. The former was tabled and the latter taken up for discussion. No agreement had been reached on Saturday and an adjournment was taken until to-day when the matter is again under discussion. A compromise will probably be reached as the associated roads are pretty evenly divided *pro* and *con*. Those roads having plenty of large capacity cars naturally oppose any reduction, while the roads having a surplus of small cars and not enough large cars favor the proposition of the St. Paul.

The committee has resolved, on a recommendation from the Western Freight Association, to hereafter change the classification by a two-thirds instead of by a unanimous vote as heretofore.

The shipment of eastbound freight, not including live stock, from Chicago, by all the lines for the week ending July 27, amounted to 41,644 tons, against 56,400 tons during the preceding week, a decrease of 14,756 tons and against 47,255 tons for the corresponding week last year. The proportions carried by each road were:

Roads.	WEEK TO JULY 27.		WEEK TO JULY 20.	
	Tons.	p. c.	Tons.	p. c.
Michigan Central	4,030	9.6	6,814	12.0
Wabash	5,726	13.8	6,443	11.4
Lake Shore & Mich. South.	5,452	13.1	6,384	11.3
Pitts., Ft. Wayne & Chicago	5,900	14.2	7,800	13.8
Pitts., Cin., Chi. & St. Louis.	4,497	10.8	7,543	13.3
Baltimore & Ohio	3,450	8.3	4,960	8.7
Chicago & Grand Trunk	3,454	8.3	3,346	6.0
New York, Chic. & St. Louis	5,605	13.5	6,682	11.8
Chicago & Erie	2,232	5.4	4,874	9.0
C., C., C. & St. Louis	1,298	3.0	1,554	2.7
Total	41,644	100.0	56,400	100.0

Of the above shipments 1,122 tons were flour, 14,416 tons grain and mill stuff, 8,001 tons cured meats, 7,925 tons dressed beef, 2,075 tons butter, 1,361 tons hides, and 4,902 tons lumber. The three Vanderbilt lines carried 36.2 per cent., the two Pennsylvania lines, 25.0 per cent.